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# PROFITABLE ENVIRONMENTAL PROTECTION (PEP) PROJECT

## *QUARTERLY REPORT*

July, August, September, 1993

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## *ANNUAL SUMMARY*

Fiscal Year, 1993

# PROFITABLE ENVIRONMENTAL PROTECTION (PEP) PROJECT

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PROFITABLE ENVIRONMENTAL PROTECTION (PEP) PROJECT

# QUARTERLY REPORT

## July, August, September 1993

Written By
Profitable Environmental Protection Staff

## SUMMARY

In the previous quarter, the Kingdom of Tonga, Papua New Guinea, and the Solomon Islands were selected as sites for future PEP interventions. Scoping is now virtually complete in Tonga and PNG. Because of potential difficulties in operating in the Solomon Islands, unless other selected countries fail to yield a sufficient number of potential interventions, further work in this country is not contemplated.

Scoping is complete in Tonga, and an intervention involving a small scale fishing enterprise has been selected. An Initial Environmental Examination has been prepared. If approved, this straightforward project will be expediently advanced. In Papua New Guinea, the Lae-based NGO, Village Development Trust (VDT) has asked PEP to participate in their Lasanga Protection Programme. Although an intervention has been identified, the need to develop between the collaborators - PEP, WWF and VDT - a mutually complimentary approach is slowing progress.

In Vanuatu, an additional extra-EMU project involving the gathering, processing, and marketing on nangai nuts, has been brought to the attention of the PEP staff. The waste-oil recovery project in Efate has been reactivated. With the wild yam project IEE approved, and an IEE for the tourism well underway, activity at Lolihor is accelerating. Profiling other potential interventions in Efate (1), Santo (2) and Malakula (2) is proceeding as rapidly as possible, and recommendations to proceed or desist will be forthcoming.

A highly qualified individual, Anita van Breda, has been

contracted as Environmental Coordinator to work with Dr. Devoe. Although not joining the Project until late January, 1994, this addition to the PEP staff will provide much needed help to the Program Manager and reduce the backlog of environmental assessment work. It has proven possible to hire locally-resident consultants, and their work has been most satisfactory.

Country selection and scoping work continues ahead of schedule, while implementation of interventions lags. It is believed that as it becomes possible to close the door on consideration of new candidate interventions, and focus upon advancement of approved projects, the rate of progress will accelerate.

## NEXT QUARTER'S WORK

Devoe, Salong, and van Breda will attend the SPREP conference "Community Involvement in Conserving Biodiversity in the South Pacific Region". Following this meeting, Devoe and van Breda, who is a marine scientist, will return to Ha'atafu Beach to consider possibilities of linking the existing ecotourism enterprise with support for the adjacent marine reserve.

Devoe and van Breda will visit Elephant Island, Santo, to consider organization of the conservation intervention there. Issues of custom ownership and land disputes may jeopardize the success of the North Santo Elephant Island Project. Stead will continue to attempt to seek information regarding this situation.

With Livo Mele, Devoe will return to Casaveia, South Santo, to collect some profiling data and discuss with the village a Carpoxylon macrospermum-based enterprise. She will draft the Initial Environmental Examination for the enterprise.

Devoe and Stead will travel to Papua New Guinea to work with VDT, GTZ, and perhaps other partners on the design of the conservation and enterprise aspects of the PEP contribution to the Lasanga project. They also plan to meet with staff from PNG's Department of Environmental Conservation to explore opportunities for PEP participation in the Hiri East Coastal Zone Management Area.

During November, Devoe and Salong will be involved with the participatory planning exercises in Lolihor with the UNDP and NPSO teams. They will also monitor wild yam planting, producing pre-PEP and current wild yam population estimates. The social soundness analysis for the Lolihor tourism enterprise will be conducted in November.

Stead and Salong will monitor the effect of the Club Mediterranean cruise ship visit to Lolihor.

Devoe will pursue forest cover estimates for the Lolihor EMU, North Ambrym.

Devoe will travel to South Malakula with Charles Vatu of the Environment Unit to provide environmental consultation for a community-initiated crab conservation project.

Stead will continue to liaise with Vanuatu's Department of Forestry to assess their interest in participating in a Whitewood Project.

Stead will continue with the feasibility evaluation of the Waste-Oil Project in Efate, Vanuatu. If the project shows promise, an IEE will be prepared.

If approval is received to proceed with the Flyingfish Fishing Project in Tonga, arrangements will be made to procure and ship to Tonga the required equipment

It has been noted that all interventions thus far considered have involved small or village based enterprises. If deemed desirable, Stead will devote some time to seeking out a large scale intervention(s).

## PROBLEMS AND PROPOSED SOLUTIONS

There is concern that a greater number of potential interventions have been delineated than can be addressed by the PEP staff. Thus, consideration of new interventions will be stopped, and project staff will focus on those interventions already defined. In the event that an intervention of exceptional merit is discovered, it will, of course, be evaluated.

## STATUS OF INTERVENTIONS

The following is a brief synopsis of the status of PEP interventions as of September, 1993. A more historical, detailed report is appended (Appendix I)

**Country 1, Vanuatu**
**EMU 1, Lolihor, North Ambrym**

With the approval of the Initial Environmental Examination (IEE), the wild yam project is progressing. John Salong, Community Liaison Officer, is procuring wild yam seed stock for planting during the current planting season. The monitoring and evaluation program is underway. Mapping the forest/garden interface in Lolihor has been initiated.

Photographs and descriptive materials depicting Lolihor's handicrafts were sent to New Zealand's Trade Aid Importers for evaluation by their product review committee. The committee reports that the presentation was very good, that some articles had potential, but that prices were much too high.

The field work for an IEE for the tourism project has been completed; the report is appended (Appendix IX). Very recently, it has been learned that the Club Mediterranean cruise ship is to call at Lolihor several times during the next few months. This may have a substantial effect on the proposed tourism project (and other PEP activities as well). Salong will monitor this situation.

The shark fin project has been discontinued.

*Carpoxylon macrospermum* project: Described as probably the only endemic plant genus in Vanuatu and clearly endangered, the protection of this palm is a high priority conservation project. Development of a formal species recovery plan is underway. A village or Port Vila-based enterprise to grow and market seedlings and plants is envisioned.

Efate Whitewood Project: Whitewood, a valuable timber resource, has been largely decimated on Efate Island. It has been suggested that PEP should 1) work to preserve an area of undisturbed old growth whitewood forest, and 2) establish a nursery to produce whitewood seedlings. The cooperation of Vanuatu's Department of Forestry (DOF) has been sought in developing this project; we are collaborating on defining an intervention. This situation will be resolved in the next quarter, and a decision made as to whether or not to advance this project.

North Santo Elephant Island Project: The Vanuatu National Marine Resource Survey (1991) recognized Elephant Island as an area of exceptional marine biodiversity. Reefs are well developed and diverse. The area is threatened by large-scale tourism activity (Fairstar, Club Med, Cunnard cruise ships). Lonnoc Beach Resort, a small, locally owned facility, Elephant Island, and the nearby Champagne Beach would all benefit from maintenance of reef quality. PEP will continue investigation of this site.

Efate Waste-Oil Project: There is no program in Port Vila (or Efate) to provide for the responsible disposal of waste-oil. It is proposed to collect and sell this oil as heating fuel. The Government of Vanuatu's Energy Unit is very interested in this concept and has agreed to conduct an informal survey of waste-oil "producers" and potential users.

Malakula Nangai Nut Project: Vanuatu's Farmers Support Association (FSA) has approached PEP for assistance in establishing an enterprise to gather, process and market nangai nuts. FSA is to prepare a business plan and develop cost data for a PEP feasibility study.

**Country 2, Papua New Guinea**

EMU I, Lasanga Protection Program: A Lae-based NGO, the Village Development Trust (VDT) has for four years managed a conservation project in the Lasanga area of the Huon Gulf. PEP has been asked to participate in the development of a small-scale commercial fishery in the region. World Wildlife Fund International (WWFI) also has a stake in VDT's efforts. PEP and WWFI are holding discussions to develop a mutually complimentary program. There are some concerns regarding the viability of VDT; this situation will be reviewed next quarter.

**Country 3, Kingdom of Tonga**

Ha'atafu Flyingfish Fishing Project: The near shore fishery of Tongatapu Island is overfished. Flyingfish represent an unused and easily accessed resource. Robert Gillett, a fisheries biologist employed as an advisor to Tonga's Department of Fisheries, suggested that PEP might develop a fishing project to exploit this unused resource. Gillett told PEP of an existing small scale fishing project that would possibly be interested in such an undertaking. Devoe and Stead met with the entrepreneur who is enthusiastic regarding the proposed enterprise. An IEE has been prepared; if approved, this project will be activated.

## CHRONOLOGY

**JULY**

Administrative Activity

Dr. Nora Devoe, PEP Project Manager and Conservation Biologist, returned to Vanuatu from home leave on July 2nd.

On July 3rd, Devoe prepared for a scoping trip to Malakula; this was cancelled due to aircraft failure.

Devoe devoted considerable time during July to continued advertising of the Environmental Coordinator position, to checking references of applicants, and to searching for consultants to cover some of the urgent tasks. Two discussions were held with a local NGO, the Clown Fish Foundation, developing plans for collaboration with them on a marine environmental education program and a reef survey for Elephant Island. Devoe met again with Jenny Whyte of the Environment Unit to discuss short-term consultancies for specific PEP interventions.

On July 30, Devoe returned to Fiji en route to Tonga. At USAID, she met with Dr. Caroly Shumway, Advisor for Environment and Science, Project Officer David Leong, and Mission Director Larry Armstrong. These meetings were primarily to bring the Mission up

to date on PEP's progress. With Leong, Devoe reviewed plans for the PEP Project Advisory Committee meeting, and sought approval for the proposed wild yam enterprise. Shumway was consulted over a period of several days for advice on developing the Elephant Island intervention in Santo, hiring an Environmental Coordinator, potential AEP Fellows in marine sciences, and incorporating resource management concerns into the Lasanga fishing enterprise. Shumway volunteered to visit the Lasanga EMU, review the project, and write the Initial Environmental Examination (IEE).

James Stead, PEP Enterprise Specialist, devoted three days to winding up the affairs of the Monitoring and Evaluation Workshop held in Vanuatu in June, 1993. This included extensive consultations with the host facility regarding their invoice, and apportioning expenses amongst attendees.

Stead met with Annette Lees, Associate Director of the Maruia Society, and with Conservation International's Timothy B Werner, Oceania Program Coordinator and Ted London, Enterprise Development Manager, to review our respective programs. Lees' comments regarding the Maruia Society's experience with an ecotourism project in Fiji were interesting, and have bearing on proposed PEP activities in No. Ambrym and the Solomons. Briefly, she noted that the Fiji project had excellent press, but that an unbiased review indicated that it had failed to achieve program objectives.

Devoe corresponded or spoke with a number of potential consultants in fisheries or marine ecology. Francis Hickey, Fisheries Advisor for Vanuatu, visited PEP offices to review the proposed Vanuatu marine interventions. He recommended others within Government's Department of Fisheries who should be contacted and who are able and may be willing to collaborate with PEP.

While in Fiji, Devoe lunched with Randy Thaman, Konai Helu Thaman, and Vili Fuavao for a pre-travel briefing on Tongan environmental issues.

## Project Activity

**Country 1, Vanuatu**
**EMU 1, Lolihor, North Ambrym**

EMU-wide Activity:
John Salong, Community Liaison Officer, has continued to advance PEP interventions in the EMU, with special emphasis on community awareness activities. On July 16th Salong and Devoe met in Port Vila to review Salong's plans for community meetings and environmental education in the EMU. Working with a local theater group, a play has been written and performed that is intended to bring village people together in a conservation awareness-raising experience. Following each performance, a discussion is encouraged in which PEP-related issues are discussed. Thirteen performances were scheduled for July and August. The theatre group has been a very effective vehicle for presentation of information and issues for discussion, and the overall program is progressing well.

See Salong's report First Round of Consultations in Lolihor, appended (Appendix II).

Shark Fin Project:
On July 27th, David Leong, USAID/RDO/SP Project Manager, called to inform Stead that a decision had been made to immediately abandon the shark fin project. It was felt that as there is virtually no data available regarding shark fin populations in the So. Pacific, a comprehensive Environmental Assessment (EA) would be required for this enterprise. An EA of the indicated magnitude would require the commitment of resources, in terms of both personnel and funds, that could not be justified by the anticipated benefit. Concern was also expressed regarding the possible negative public relations that could accrue to PEP and USAID as a result of this proposed intervention.

Wild Yam Project:
On July 5, Devoe met with Jeremy Challacombe to discuss Terms of Reference for preparation of a Lolihor tourism IEE, developed further in two subsequent meetings.

July 8th through 15th, Consultant Suliana Siwatibau worked with Salong in Lolihor, collecting traditional knowledge relating to wild yam cultivation, documenting farming methods, and writing the IEE for a wild-yam enterprise. Her investigation of wild yam cultivation and harvesting found these to be non-detrimental to the forest ecosystem. See Siwatibau's report Wild Yam Cultivation in Vanuatu, appended (Appendix III). PEP staff propose to encouraging wild yam production through distributing planting stock, demonstrating successful wild yam farming, discussing the rationale for wild yam cultivation within PEP's environmental education program, and furthering an existing produce distribution enterprise to buy the wild yams from rural growers, transport them to urban markets, and sell them. Monitoring for this intervention includes tracking areas of gardens and forest cover, the extent of wild yam plantings, and income from wild yam sales. Production and sale of wild yams grown under forest cover are intended to provide both food and cash from the forest, thereby encouraging forest retention.

Devoe, Stead, and Fry met to consider the best way to implement wild yam distribution in Lolihor. The consensus was that the yams should be sold rather than given away. Yams could as easily be eaten as planted, and a scheme was wanted to ensure that the yams would be planted. Stead drafted a plan and forwarded it to Salong. Salong found that farmers would not buy yams. They were not being intransigent, but rather acting according to established custom practice. When intended for use as food, yams are bought and sold, (or bartered), but yams to be used for seed tubers are exchanged without apparent or immediate compensation. Salong proposed instead that he collect seed tubers from his own ancestral land with PEP support for labor and transportation. He would then provide the yams in return for farmer's collaboration in marking and monitoring the yams. We will proceed to test this plan, with PEP purchase of yams from other areas of Ambrym as our fallback option.

To provide a foundation for EMU-wide activity, Salong organised a meeting of area political leaders to discuss the future of North Ambrym. Although not addressing immediate PEP issues, a reading of the transcript of this meeting presents an interesting view of the conflict between the traditional chiefly political structure, and a western system of parliamentary government with its elected representatives. A loose transcript of this meeting is appended. (Appendix IV).

Note:
Previous reports have referred to this as the "North Ambrym EMU". North Ambrym is a political entity of which the EMU is a relatively small part. The name "Lolihor" is a more descriptive and accurate place name for the EMU, and will be used in this and subsequent reports.

**Extra-EMU Activity**

Carpoxylon macrospermum Project:
We received from the world palm expert John Dransfield (Royal Botanical Gardens, Kew) a lucid defense of Carpoxylon as a taxon and vigorous endorsement of a conservation program.

Devoe set up a small germination experiment at her home to determine suitable propagation methods for the species. She was presented with 32 seeds during her May 28-June 4 visit to Casaveia, South Santo. Due to a mix-up at the Forest Herbarium, the seeds were held in their damp packing for five weeks before sowing. Four floated when suspended. All seeds were sown in pots filled with standard potting mix, half in shade and half with full exposure for three hours daily. Germination lagged behind imbibition for three weeks or more. To date, 28 of 32 seeds have germinated, including three that floated and were thought to be unfilled. No statistical difference in germination rates or percentages between the two treatments was found, although seedlings in the sun treatment are statistically larger than those in complete shade. On September 7 (approximately six weeks after sowing), fronds were just beginning to unfold.

Devoe met with Pat Curry and Livo Mele on two occasions to continue discussion of a conservation intervention for Carpoxylon macrospermum. Devoe wrote a memo to the Environment Unit describing possible scenarios for developing a horticultural intervention to protect this species.

On July 27th, Devoe, Mele, and Curry made a tape about their work with Carpoxylon with radio journalist Carolyn Court. This aired on Radio Australia's One World program, broadcast via shortwave to 64 stations worldwide. A transcript of the program is attached (Appendix V). Since the radio broadcast, Devoe and Curry have received four letters (three from botanists) and two requests for purchase of Carpoxylon seedlings from Vila-based collectors. Devoe has drafted a plan for the project, which will be discussed with the Environment Unit and Department of Forestry and sent to

scientific reviewers, once an IEE is approved. The IEE is the next step.

Vanua Lava wild yam project:
Devoe spoke with Father Dini regarding plans for a scoping mission to Mota Lava to see his proposed wild yam planting sites. The proposed trip was cancelled due to political congress on Mota Lava. Devoe again met with Fr. Dini during his visit to Vila at the end of August. He will settle his affairs and contact us when he is ready to plant wild yams.

Whitewood Project:
Devoe attempted to speak with or see Leonard Bule, Director of Forestry, regarding this proposed project. She wrote a letter detailing the issues to be discussed, including a whitewood nursery enterprise and coordination of this activity with Forestry, and requested use of Forestry Department personnel for PEP work. Attempts to coordinate with Forestry continue.

Malakula, Bonvar & Benvat, Crab Project:
On July 7th, Devoe met with Charles Vatu, of Vanuatu's Environment Unit, to discuss joint PEP/Environment Unit assistance to the Bonvar and Benvat communities in South Malakula. These communities contacted PEP via Peace Corps volunteer Charles Allen with a request for help in re-establishing their edible crab populations. Crabs have declined to near-exhaustion due to over-exploitation. Because of rough seas and scarcity of deep-water boats, villagers are heavily dependent upon near-shore resources for protein. Vatu agreed to travel to the sites with Devoe, to provide a standard, one-day, Environment-Unit Environmental-Education Workshop, and then to spend a second day thinking through the crab problem with the villagers. Regrettably, neither Devoe nor Vatu know enough about crab biology to determine exactly what is needed and what might work best. Devoe and Vatu agreed that the first trip would be a preliminary needs assessment; if these sites and communities are suitable for PEP intervention, additional technical expertise can be provided, perhaps by Anita van Breda. This visit is planned for late October, 1993.

## Travel

Stead Travels to PNG, July 11-25.
While passing through Port Moresby, Stead met with FSP/PNG's Director of Programs, David Vosseler. Vosseler provided Stead with a comprehensive review of FSP/PNG programs, and Stead gave an overview of PEP activity. Vosseler affirmed that FSP/PNG was willing to support the PEP project as deemed appropriate.

Stead met with Rolland Maein, Director of Hanuacraft, a handicraft marketing operation serving both the wholesale and retail trade. Maein's experience is relevant to the PEP handicraft project in Lolihor. Stead also met with Morris Brownjohn, owner of a fishing equipment supply business in Port Moresby, and Director of PNG's Fisheries Industries Association. The purpose of the discussion

was to learn more about shark fin marketing; Brownjohn has no first-hand experience in this trade.

The primary purpose of this trip was to follow up on Devoe's previous visit in November and December, 1992, and to evaluate two projects as candidates for PEP interventions. The first was the Lasanga Protection Programme, a conservation program directed by a Lae-based local NGO, the Village Development Trust (VDT). The project is sited on the Huon Gulf coast southwest of Lae, and encompasses an area of 220,000 ha. of forest on the mainland and a small group of near-shore islands. Accompanied by David Leong, USAID/RDO/SPO, and VDT's Director, Sasa Zibe-Kokino, four days were devoted to touring the area and meeting with villagers to discuss their interest in a small-scale commercial fishing project. Upon return to Lae, Stead met several times with Sasa Zibe-Kokino and his staff to discuss the fishing project.

Meetings were held with other organisations that could provide support for this project. These included a German aid agency, Deutsche Gesellschaftfuer Technische Zusammenarbeit (GTZ), who support small-scale fishing projects by providing technical expertise and infrastructure support to a project known as the Momase Coastal Fisheries Development Project (MCFDP). In discussions with MCFDP's Director, Peter Jarchau and Dr. Kurt Wagner, Socio-Economist, it became clear that they have a wealth of information and experience that would be invaluable to a PEP fishing project in the Lasanga area. A meeting was held with Barkley Kua, Assistant Secretary (officer-in-charge) of PNG's Department of Fisheries (DOF) to assess their ability to support the proposed PEP project. Both GTZ/MCFDP and DOF encouraged PEP to go forward with the project, and offered their support.

Stead met with Lucas Ramaso, General Manager of Kum Gie Corp. Ltd., a non-profit organisation providing business consulting services to locally owned businesses. Kum Gie is willing to assist the proposed fishing project with respect to record and bookkeeping.

Stead met with staff of PNG's Agricultural Bank (the country's development bank), to review their lending policies as they relate to fishing projects. Because the proposed fishing project is community-based (as opposed to a single entrepreneur), and because of the Bank's dismal experience with community-based projects, the Bank would not support the project.

While in Lae, Stead met with Robin Leahy, Managing Director of the Melanesian Arts Center Pty. Ltd. to discuss handicraft marketing issues (as they might related to PEP's handicraft activity in the North Ambrym EMU).

Upon returning to Port Moresby, Stead met with William Asigau, formerly an employee of PNG's Department of Environmental Conservation (DEC) to discuss a conservation project in the Hiri East district of the Central Province, adjacent to Port Moresby. There has been an ongoing effort to establish a formal Wildlife Management Area, to be known as the Hiri East Coastal Zone Management Area, as a vehicle to better protect and conserve the

area's resources. Stead met with representatives of the four villages in Hiri East to gain an understanding of their needs and concerns. The following day was devoted to a tour of the area, accompanied by Asigau and village leaders. Subsequently, Stead and Asigau discussed the possibility of PEP participating in certain discrete aspects of the Hiri East Project.

Stead then met with Samuel Antiku and Laster Seri of the DEC's Resource Inventory Branch to review progress in establishing the Wildlife Management Area, and to introduce the PEP project. Should we consider an intervention at Hiri East, these people would be valuable contacts.

A report detailing this trip to PNG is appended (Appendix V).

**AUGUST**

Administrative Activity

In Suva, on August 3rd, Devoe met with Leonard Chan of the Asia Foundation. They discussed PEP's application for an Asia Environmental Partnership Environmental Fellow. Chan reviewed the conditions of the Fellowship. Because the Fellowship is intended as a training for the Fellow, his or her salary is to be contributed by the home agency. Devoe was concerned that this would prevent some potential Fellows from participating. The candidates identified by PEP were perhaps more senior than those for whom the Fellowship was designed. They also discussed fellowship options to send PEP staff to the US for training, and to bring US professionals to the Pacific for work with PEP.

While in Suva, Devoe called upon FSP's Regional Administrator, David Wyler, to ask for assistance with logistic matters and catch up on FSP affairs.

Milika Nagasima, a lecturer in biology at the University of the South Pacific, met with Devoe, who had asked her to apply for the Environmental Coordinator position. Milika said that she preferred to remain in academia but that she would very much like to do some short term work for PEP. She has expertise relevant to PEP fisheries interventions, the Santo Elephant Island project now under investigation, and marine conservation education. Devoe proposed that she be considered for an AEP Fellowship with PEP, which would give her an additional credential that might be helpful if she seeks support for doctoral work. Milika is also involved with the Women in Fisheries Network, which could be very useful to PEP. Women are excluded from open-water fishing in many Pacific cultures, with their fishing confined to gleaning from shore. Input from members of the Women in Fisheries network could contribute to improving women's access to PEP's marine interventions.

Devoe met with Robert Gillet, FAO Regional Fisheries Adviser, to describe the PEP project and seek help in identifying potential marine-based projects, specifically for Tonga. Gillet has an encyclopedic knowledge of Pacific fisheries and agreed to think about activities that might link protection of biological resources and biodiversity with profitable enterprises.

En route to Vanuatu from Fiji, Nora Devoe had the pleasure of meeting the FSP UK Director, Dory MacIntosh, and the FSP Kiribati Director, Mary McMurtry. They discussed their respective programs and potential linkages between PEP and other FSP activities.

Back in Vanuatu, Devoe followed up on the meeting with the Asia Foundation by sending nominations for two ni-Vanuatu PEP staff to travel to the US, requesting two U.S. professionals to assist PEP, and nominating a Pacific Islander to work with PEP in Vanuatu and Papua New Guinea.

In Port Vila, Devoe met with the head of USP's School of Education and Psychology, Prof. David Jenkins. Jenkins visited Vanuatu on a mission to bring more ni-Vanuatu to USP Suva, and talked with Devoe about USP's interests and resources for environmental education.

Anita van Breda has been contracted as the PEP Environmental Coordinator, although she will not join the staff until January, 1994. Van Breda holds the Master of Environmental Studies degree from Yale University and a BA in Biology from George Mason University. She is presently Program Director at the Center for Coastal Studies at Yale, and has been employed previously with the Center for Marine Conservation, the National Park Service at St. John, U.S. Virgin Islands, and with the International Field Studies Program, Andros Island, Bahamas. Her background in marine ecosystem management and conservation will be a very welcome addition to the PEP skills pool. Van Breda will attend the PEP Advisory Committee meeting at the close of the quarter and work with Devoe on further plans for an intervention at Ha'atafu Beach, Tongatapu.

Plans were finalized for the PEP Project Advisory Committee meeting. PEP project staff (Devoe, Stead, Salong, and new hire van Breda), USAID/RDO/SP Project Officer David Leong, USAID/RDO/SP Advisor for Environment and Science Jay Smith, USAID/R&D/WID's Rosalie Norem, WWF South Pacific Program Director Don Henry, and FSP USA's representative Kathy Fry are scheduled to meet in Nuku'alofa, Tonga from September 29th to October 2nd, 1993. The purposes of this meeting include a review of progress to date (project has now been staffed one year) and review of the work plan for FY 94.

August 24, Nora Devoe met with Ernest Bani, Head of the Environment Unit, to compare notes on working in the Banks and to review PEP activities generally.

PEP staff were visited by Daniel Brimm, Director of the World Center for Birds of Prey in Boise, Idaho, and Dr. Clayton White, Professor of Zoology at Brigham Young University in Provo, Utah.

Brimm and White are researching the population crash of peregrine falcons in Fiji. Their hypothesis is that the birds suffer from inbreeding depression, based on their judgement that habitat and prey base are intact. They travelled to Vanuatu to collect blood samples of the Vanuatu population for genetic analysis. With Dr. Devoe, they reviewed the extent and structure of the peregrine population in Vanuatu, discussed historical trends in habitat alteration, and suggested conservation sites for seabirds.

Project Activity

**Country 1, Vanuatu**
**EMU 1, Lolihor, North Ambrym**

EMU-wide Activity:
While in Fiji, August 1-4, Devoe worked with Thaman tabulating and analysing of the ethnobotanical data from Lolihor. Professor Thaman's zeal for botany, abiding interest in traditional uses and agriculture, and respect for the cultural dimensions of resource use continue to inspire this work. Species lists from the survey are available in the PEP office.

On August 2, Devoe met with Jeff Liew and Nestor Pestelos of the Equitable and Sustainable Human Development Program, UNDP, to discuss concerns with plans for the participatory planning exercises scheduled for Lolihor in November. Salong and Devoe had expressed disappointment that the timing for this activity had gotten later and later, as PEP very much needs the larger vision and framework that the UNDP process will provide to the Lolihor community. Clarification was sought and received as to the methods for selecting village representatives, local trainers, and national trainers. Devoe was assured that indeed all the interest groups within the community would participate, even the migrants who are sometimes on the sidelines in community activities, and that the EMU rather than the local area (a political division) remains the focus of the exercise. We anticipate many benefits from this exercise and look forward to continued collaboration with UNDP.

Randy Thaman arranged a reunion of the North Ambrym Community Resource Assessment team, so Devoe met with Tarcisius Kabutaulaka, the Solomon Islander who had worked on both marine and terrestrial surveys; Bob Tuxson, the naturalized Fijian who had headed the marine resources survey; and Aliti Vunisea, the Fijian specializing in women's use of marine resources. They discussed options for the follow up during which the data they collected would be returned to the Lolihor community.

PEP has implemented activities to reduce the loss of forest cover in North Ambrym. In order to determine the effects of these activities, and to guide the decision-making processes both of the project and the community, a monitoring and evaluation program has been designed. A key component of this program is tracking the changes in forest cover and areas cleared for gardening. Jeremy Adams, a professional surveyor from New Zealand, was in Vanuatu teaching surveying for the Public Works Department. He was hired

to map the forest/garden interface in Lolihor.

Although Adams was equipped with a GPS, he grossly underestimated the amount of time needed to complete the work and overestimated his ability to distinguish on the ground forest in varying successional stages. As a result, he mapped locations of garden inclusions within the so-called "dark bush", or old growth forest, which he was able to recognize. These gardens are the points of forest felling furthest from villages within the EMU. By comparing Adams's 1993 data with the 1986 base aerial photographs, the extent of forest loss can be gauged but not actually measured.

At the end of the calendar year, Devoe will complete the photo interpretation to place the forest/garden interface and gardens within the dark bush on the 1986 photos and field check for the 1993 interface. Devoe met with Department of Lands and Survey to discuss use of their stereoscope and planimeter for mapping from the 1986 photos, and had a set of enlargements made in preparation for the field work.

**Extra-EMU Activity**

Carpoxylon macrospermum Project:
The University of the South Pacific Botanical Gardens provided an appropriate venue for a meeting between Devoe and Dr. Mycol Doyle, new Director of the South Pacific Regional Herbarium at USP. Doyle agreed to check Herbarium and Garden records for mention of Carpoxylon. (Devoe is attempting to track all the specimens distributed from Vanuatu to assemble the location data on the herbarium sheets.) Doyle appeared very interested in PEP and in conservation biology generally and would be a good botanical consultant if the Government of Vanuatu Forestry Department cannot provide the assistance.

A letter directed to PEP from Ernest Bani, Principal Environment Officer, Environment Unit, stated that his office would not issue export permits for Carpoxylon or other species that are endemic to Vanuatu. Bani cited provisions of the CITES agreement, and a desire to keep Carpoxylon materials out of the hands of foreign interests, as reasons for this prohibition. Obviously, this policy has a serious negative impact on the future of a Carpoxylon-related enterprise. Further discussions are planned.

Malakula Ringi Te Suh Reef Restocking Project:
Devoe met with Jack Enrel, leader of the Ringi Te Suh Marine Conservation Area initiative in the Maskylene Islands, South Malakula, Vanuatu. Ringi Te Suh is a community-initiated, self-funded conservation project that has restocked a privately owned reef flat with Tridacna clams. Enrel heard about PEP through our correspondence with Benvat and Bonvar villages and called upon Devoe to request further information about the reproductive biology of clams. Enrel is impressive-- extremely articulate, highly motivated, full of ideas. PEP would like very much to support this project. Objectives of an intervention would be to protect the initial efforts of villagers, encourage continued protection of the

area, improve efficacy of the reserve to restock other areas, add additional organisms to those protected and produced in the reserve, and assist with reserve management. Achieving this will require some technical expertise, support for a community-lead environmental education program, perhaps minor seed money to collect and purchase additional organisms. Though this is a subsistence-economy effort, the villagers would like eventually to have enough marine produce to sell. Because of this long-term perspective, this site is not recommended as a full-scale EMU. Devoe would like to support it in partnership with the Environment Unit, which can provide long term institutional support.

Malakula Bonvar and Benvat Crab Project:
While in Suva, Devoe also met with Gary Preston, Coastal Fisheries Programme Manager for the South Pacific Commission (SPC), to ask whether the SPC might assist with technical expertise for shellfish enterprises. The Vanuatu villages of Benvat and Bonvar (Malakula) asked PEP for assistance in establishing a protected area for crabs. PEP would like to assist with management and conservation options for re-establishing crabs and other marine organisms and habitat protection, but would need outside expertise. Another Vanuatu village is already working with a clam sanctuary and has also asked PEP for technical assistance. Preston agreed to look into what the SPC could provide. PEP could make its request through the Government of Vanuatu if needed.

Malakula Nangai Nut Project:
Charles Rogers of Vanuatu's Farmers' Support Association (FSA) has approached PEP for assistance in developing an enterprise to gather, process, and market nangai nuts. The project would encourage conservation of the forest through utilizing this non-timber forest resource. Rogers and FSA would manage the program. If successful, replication of the enterprise would be relatively simple. Demands on PEP would be modest; the first task will be to determine if the enterprise is financially viable.

Santo, Matantas Conservation Project:
New Zealand's Forest and Bird Protection Society (FBPS) has for some time had an interest in a conservation project in the Matantas area of Santo. FBPS staff was to revisit the site to conduct more field work during August. At her request, Stead briefed Sue Maturin, a member of the staff, on PEP's activities and experience in Matantas.

**Country 2, Papua New Guinea**
**EMU 1, Lasanga Protection Programme Project**

Lasanga Fishing Project:
Stead received a letter from VDT's Zibe-Kokino describing a meeting with village leaders concerning the proposed Lasanga Fishing Project. Believing that there was a need for clarification regarding PEP's role in this project, a letter was sent to Zibe-Kokino. This letter described capabilities and limitations of the PEP project as it relates to the Lasanga Fishing Project, discussed

staffing the project, and proposed a plan of action.

**Country 3, Kingdom of Tonga**
**Extra-EMU Activity**

Ha'atafu Flyingfish Fishing Project:
At the suggestion of Robert Gillett, Fishery Advisor to the Government of Tonga, an intervention has been proposed on the island of Tongatapu. The enterprise would be a flyingfish fishing project. Several pieces of specialized equipment would be required to activate this. Returning to Vanuatu via Fiji, Stead met with Kevin Passfield, a fisheries biologist at USP, with experience in the flyingfish fishery. Passfield had been recommended by Gillett as a person qualified to procure the necesssary gear. Passfield is clearly qualified to undertake this work, and is willing to do so.

Stead prepared an IEE for the Flyingfish Fishing Project. This was directed to Gillett in Tonga for review and comment. The IEE was subsequently sent to USAID/RDO/SP.

Stead wrote the manager of the Ha'atafu Surfing Resort and requested that he keep catch records for the existing fishing activity; this is to provide baseline data for the proposed project.

This project will require a modest source of energy to recharge 12v wet-cell batteries. The U.S. Government's Committee on Renewable Energy, Commerce and Trade (CORECT), in the person of the Department of Energy's International Trade Specialist Les Garden, was contacted for suggestions relative to the possible use of photovoltaic technology to provide this energy. Garden responded, suggesting a rather larger program than is germane to the proposed project. As project needs are further defined, CORECT will again be approached.

Travel

Devoe and Stead Travel to Tonga:
From the evening of August 4 through August 14, Stead and Devoe travelled in Tonga. This trip was facilitated by FSP's Tonga office through its Director, Denis Wolff. The purpose of this trip was to follow up the scanning work and preliminary scoping done by Dr. Shumway. It seemed that the most promising ideas were those involving production of native economic species. However, it was found that the enterprise dimension was not promising for those planting activities with greatest environmental appeal, and vice versa. Devoe and Stead pursued an idea presented by Bob Gillet for a flying fish fishery, which did fulfil all of PEP's criteria. A in-depth report covering this trip is attached (Appendix VII).

**SEPTEMBER**

Administrative Activity

September 18th and 19th, Devoe again worked with Thaman at USP, Suva, finalizing a draft of their paper for the Heads of Forestry Meeting (Appendix VII). Devoe participated in the Heads of Forestry Meeting in Nadi from September 20-24, after which she returned to Suva.

While in Suva, Devoe again met with representatives of the Asia Foundation, David Wyler at FSP Fiji, and Mycol Doyle at USP. With John Salong, she met with Jeff Liew and Nestor Pestelos at UNDP to review plans for their joint work in Vanuatu scheduled for November.

At their request, Stead met with Dr. Dan M. Etherington, Australian National University, and Dr. David L. Hagen, AcrossTech, to discuss their coconut oil extraction scheme. The thesis is that extraction of coconut oil at the village level with a simple hand-operated press would yield greater return to the people than does the traditional production of copra. Etherington and Hagen were interested in 1) an opinion as to the viability of the concept, 2) sources of additional funding for the project. Stead suggested that, among other things, the project would benefit from additional emphasis on the marketing aspect. With regard to funding, it was pointed out that PEP did not have funds to support a research project of this type. Several possible donors having local representation were discussed.

Karin Theophile, an Enterprise Specialist, USDA Forest Service, International Forestry, will join PEP for a one month internship in February, of 1993. Stead continues to exchange information with Theophile in preparation for her impending stay. It is planned that she will analyze the market for whitewood seeds and seedlings for reforestation.

**Country 1, Vanuatu**
**EMU 1, Lolihor, North Ambrym**

Tourism Project:
From September 2-9, Salong worked with local environmentalist Jeremy Challacombe on the Initial Environmental Examination and development planning for the Lolihor tourism enterprise. Challacombe's report and recommendations are appended (Appendix IX). During Challacombe's visit, Lolihor was visited by a representative of Club Mediterranean. This person was arranging for monthly one-day visits by the Club's 400-passenger cruise ship. The first visit is scheduled for November 25, 1993. This event will have a significant impact on PEP's tourism project.

Early in September, Devoe asked UNDP Equitable and Sustainable Human Development Programme Director Jeff Liew whether Dr. Pestelos could again assist PEP with a social soundness analysis, this time for the proposed Lolihor tourism enterprise. UNDP responded in the affirmative.

Handicraft Project:
Trade Aid Importers, a New Zealand not-for-profit handicrafts distributor, had been sent photographs, descriptive materials and selling prices for handicrafts produced in Lolihor. They have informed us that their product review committee was favorably impressed with the handicrafts and the PEP presentation. The committee felt that prices quoted were substantially higher than the market would tolerate (more than a factor of two). They are considering promoting a special exhibition of Vanuatu's handicrafts, but as yet have come to no conclusion. (In conversation with Trade Aid staff, this seems to be a remote possibility.)

Trade Aid has had previous experience with Vanuatu's handicrafts, having imported a representative inventory within the last two years. Although priced well below the level proposed by PEP and heavily promoted, this stock did not sell. Much of it remains in their inventory. The issue of price is a major stumbling block, and confirms the experience of the MARC Project. This issue will be discussed with the Lolihor Community Liaison Officer to see if a strategy can be developed to deal with the problem.

**Extra-EMU Activity**

Carpoxylon macrospermum Project:
Pat Curry of the Vanuatu Department of Forestry has received requests from persons wishing to purchase Carpoxylon seeds and/or seedlings. Stead and Curry have agreed that PEP will receive a record copy of all such correspondence, and further that Stead will respond to these requests.

Stead met with local nursery and landscaping service operators to attempt to determine the size of the local market for Carpoxylon. Preliminary indications are that demand would be limited, in the order of 100 seedlings.

Waste-Oil Recovery Project:
Stead met with the Director and staff of Vanuatu's Energy Unit to discuss waste-oil recovery. The concept is that used lubricating oil is to be collected from auto service centers, diesel generating stations and similar sources, and sold as a substitute source of heating fuel to users such as the hospital, hotels, and sawmills (for use in firing drying kilns). The waste-oil would not be re-refined. In addition to providing a low cost energy source, this activity would reduce energy imports, a key goal stated in Vanuatu's current National Development Plan.

Energy Unit personnel were enthused about this concept. They agreed to make an informal survey of waste-oil "producers", and potential users.

Santo, Matantas Conservation Project:
Devoe and Stead met with Grant Rosoman, who had been sent to Matantas, Santo, by the New Zealand Forest and Bird Preservation Society (NZFBPS). Rosoman had initially brought the Matantas forest to PEP's attention in October, 1992. Subsequently, both

Shumway and Stead examined the area. At the time of Stead's visit, a logging contract had been signed, but was later rescinded. Stead concluded that because of its isolation and the lack of entrepreneurial activity in the community, Matantas would be a very difficult site for PEP. On this trip, NZFBPS had sent Rosoman to evaluate potential income-generating schemes to offset foregone logging revenues. Rosoman's findings generally confirmed PEP's position, that is, the people of the Matantas area evidence little interest in enterprise initiatives, and the probability of success of such activities would be low. With NZFBPS, Gov. Vanuatu (Environment and Forestry) have contributed to the biotic inventory of the area. Rosoman and Bani are to produce a draft set of recommendations for resource management and income generation during this month, which will be reviewed by the Matantas community. NZFBPS has sought PEP assistance; we left it that if they identify a viable enterprise option, we will consider a partnership with them.

## FSP HEADQUARTERS ACTIVITY

Normal headquarters financial and administrative back-up has continued during the quarter. San Diego-based staff maintain close contact with the Pacific desk officer at the State Department and with the group of Washington-based diplomatic representatives from the region.

The Finance Department continues to receive and review monthly field financial reports, with all transactions examined for compliance with AID regulations and circulars, and with grant budget parameters. This office prepares and submits the monthly form 272 and quarterly reporting form 269. Preparation for, and direction of the annual CPA audit is an ongoing activity. The Finance Department supports the Field Team in matters relating to corporate policies, personnel policies, and payroll. They have also been helpful in researching and purchasing computer hardware and software, and assisting in the maintenance of this equipment.

## DOCUMENTATION

Project documentation for this quarter included a trip report for the visit to Santo, the project report for the April-May-June quarter, an early draft report for the July-August-September quarter, annotations to Stead's Tonga trip report, and a paper for the South Pacific Regional Environmental Programme's Fifth South Pacific Conference on Nature Conservation and Protected Areas, for which the theme is "Community Involvement in Conserving Biodiversity in the South Pacific Region". Devoe was asked to present a paper describing PEP as a funding mechanism for biodiversity conservation, and given subject headings for the paper sections. Her paper following the SPREP outline is appended (Appendix X). With Professor Randy Thaman of the University of the

South Pacific, Devoe prepared a paper for presentation at the 1993 Heads of Forestry Meeting, the theme of which was "What Value Forests and Trees?". Their paper treats the ethnobotany of Lolihor (North Ambrym EMU) and changes in resource status based upon data collected during the March, 1993 Community Resource Assessment (Appendix VIII).

Stead prepared trip reports for travel to Papua New Guinea and the Kingdom of Tonga. Consultant Suliana Siwatibau authored a report entitled Wild Yam Cultivation in Vanuatu. This report includes the IEE for the Lolihor Wild Yam Project. From USP's Randy Thaman, PEP has received species lists from the ethnobotanical study in Lolihor.

**APPENDIX I**

# *STATUS OF INTERVENTIONS*

## *September 1993 Update*

The following sites have been considered for PEP intervention:

Country 1, Vanuatu
EMU 1, Lolihor, North Ambrym

Situation: Gardens in the Lolihor EMU are expanding at the expense of forest, largely because the inhabitants are expanding production as a source of cash. Traditional slash and burn practices necessitate site rotation every year.

Conservation Objective: To reduce loss of forest cover occurring as a consequence of expanding gardens.

Enterprise Intervention: Enterprises that provide an alternative source of cash income, give new added value to natural resources, or that substitute destructive gardening for more sustainable exploitation will be expanded or developed, thus reducing dependence on cash cropping (cocoa, copra, cattle, peanuts) or market gardens (mostly taro and sweet potatoes) for income. Proposed enterprises are (1) a tourism project, (2) handicraft sales, (3) cultivation of wild yams, and (4) processing and sale of shark fins.

**Recommendation: March, 1993. PEP Team recommends adoption of this EMU, with further investigation of specific interventions.**

**Status: September, 1993.** Profiling completed, active EMU, Initial Environmental Examination submitted and approved for wild yam enterprise, IEE in progress for tourism project, handicrafts under investigation, shark fin enterprise dropped. Monitoring and evaluation and environmental education programs are active.

**Recommendation: September, 1993: Continue to advance tourism, handicraft, and yam initiatives.**

Extra-EMU Activity

Carpoxylon macrospermum Project

Situation: Carpoxylon macrospermum, a palm in what is described as probably the only endemic plant genus in Vanuatu, is botanically

important as a very distinctive genus with few close relatives, and clearly endangered. The palm was apparently an important food for coconut crabs, flying foxes, and to a lesser extent, people (edible fruit) before its population declined. Thought to be extinct prior to rediscovery in 1987, Carpoxylon was known from at least one site on Santo (four plants), and suspected from sites on Erromango, Tanna, and Ambae (20 individuals total). Without conservation measures instituted immediately this species is likely to become extinct. One site where the palm occurs is in the village of Casaveia on the family land of Livo Mele, a ni-Vanuatu forester employed by the ACIAR project. Livo indicated desire and willingness to further conservation of this species.

Conservation Objective: Multiplication of the remaining palms to ensure the survival of the species, protecting the full range of the plant's genetic diversity, assessment of the existing population and development of a formal species recovery plan, protection of habitat of palms found in the wild.

Enterprise Intervention: A village-based and/or Port-Vila based nursery to produce and sell the palm to Vanuatu collectors and landscapers. Providing there are no legal restrictions, seeds or seedlings could be sold to the lucrative international palm trade, with sales initially directed to palmeta and research institutions. Money is to be returned to village projects and further conservation efforts.

**Recommendation, September, 1993: The enterprise has excellent conservation value. The village of Casaveia is one extended family, very much interested in working with PEP. The enterprise potential of a palm nursery is to be evaluated. Success may hinge on the ability to access the international market; this situation will be clarified.**

Vanua Lava Wild Yam Project

Situation: Traditionally, wild yams have been a source of food and a crop to be bartered or sold for cash income. Over-exploitation has reduced existing stocks to negligible levels. An influential native asked that the PEP team assist him in restoring this resource, and in developing an in-situ germplasm collection, with cultivars from throughout Vanuatu.

Conservation Objective: To reestablish wild yam varieties in the Banks and Torres, and to preserve the full range of Vanuatu's genetic diversity of this crop.

Enterprise Intervention: Working with the self-identified entrepreneur, PEP would assist in finding and propagating suitable wild yam germplasm for sale in the Banks region. Yams are to be sold as planting stock and food.

**Recommendation April, 1993: PEP Team recommends adoption of this EMU as a replication of the proposed North Ambrym wild yam intervention, isolating wild yams in this case and pursuing no other enterprises. Partnership with the GOV Environment Unit on other interventions is an option.**

**Status: September 1993.** Nora Devoe scheduled a profiling trip with Fr. Dini, which he then canceled due to the UMP party congress held at Mota Lava. Since that time, questions about his handling of VRDTCA funds, church funds, and Environment Unit project money have surfaced. While the wild-yam enterprise might be immune from the need to closely monitor funding because the effect is to enrich the entrepreneur personally, the implication is that supervision would be needed to assure that work was actually completed, monitored, etc.

**Recommendation, September 1993: Proceed with caution, low priority.**

Efate Whitewood Project

Situation: The best forest remaining on Efate is held by the communities of Epao and Pang. However, the area is now under a logging contract, which is being conducted with no apparent concern for the residual forest.

When interviewed in October, 1992, leaders of the villages holding custom title to the lands stated that they wished to continue the commercial logging because of the income received, and also for the improved access to firewood and other materials created by the extensive logging roads and skid trails. Based on villager's responses to a traditional use survey and prevalence of metal roofs and other manufactured materials used instead of bush materials, Dr. Devoe concluded that the likelihood that these communities would be effective PEP partners was low.

In March, 1993, the Department of Forestry was approached by a landowner who sought a logging concession for approximately 500 ha of what was reported to be excellent whitewood in this same area. When the Forest Utilization Officer raised the possibility of conserving the forest and generating income by means other than logging, the landowner appeared sincerely interested. Forestry contacted PEP for assistance in developing a project to keep the whitewood stand unlogged.

Conservation Objective: Preserve the best stands within the area, conserve the residual forest, and provide a source of germplasm to restock cut-over areas. The conservation value of keeping the 500 ha unlogged is very high, both from a strict biodiversity viewpoint and from an economic viewpoint-- a source for restocking whitewood is needed.

Enterprise Intervention: The establishment of an enterprise to conserve existing stands of the popular timber Endospermum medullosum and to encourage and support reforestation efforts has been considered from a number of angles. Likely related enterprises might be developing a seed supply business or developing a forest nursery business with some sort of conservation agreement negotiated in return for technical assistance. The enterprise outlook is considered very promising, with large landholders expressing interest in purchasing nursery stock, and some already planting.

**Recommendation, September, 1993: PEP would like to proceed with**

**development of this project. However, before activating any plan, staff would like to attempt to coordinate with the Government of Vanuatu's Department of Forestry and with the related Australian Centre for International Agricultural Research (ACIAR) project. So far, the Director of Forestry has not responded to our overtures.**

North Santo Elephant Island Project

Situation: Lonnoc Beach is a modest ni-Vanuatu owned and operated tourism enterprise established in 1989. It promotes day trips to nearby Elephant Island as an income-generating tourist activity. The Vanuatu National Marine Resource Survey recognizes Elephant Island as an area of exceptional diversity, and recommends it for national conservation priority. Elephant Island is one of the best coral gardens and richest marine ecosystems in the country, mostly in excellent condition. The reef is well-developed and diverse, being mostly protected from high wind and waves on the south side. There is some suggestion that parts are overfished, and that turtles are hunted in the vicinity. The island itself is a small coastal shelf surrounding a high, steep-sided plateau. The forest is patchy, with small areas of coconuts interspersed with excellent limestone forest rich in Calophyllum. This island is a very nice tourist destination which would make an excellent nature preserve. Another major tourist attraction, Champagne Beach, is adjacent and also has an excellent patch reef.

Conservation Objective: To institute a private, protected area to safeguard the exceptional marine biodiversity of Elephant Island, threatened by uncontrolled exploitation and large-scale tourism (Fairstar cruise ship shipboard diving).

Enterprise Intervention: Lonnoc Beach Resort, Elephant Island, and Champagne Beach would all benefit from maintenance of reef quality at Elephant Island. We propose to investigate the enhancement of existing guided tour/snorkeling/diving enterprises to support a protected area, and to improve tourist services at Lonnoc Beach in exchange for cooperation in management of Elephant Island. The appeal for working with an established business (Lonnoc) is very high. Some baseline data is available and conventional business indicators can be employed to demonstrate progress (or lack thereof).

**Recommendation September, 1993: This project is highly recommended for continued investigation. Land disputes are rumored for Elephant Island. The relationship between Lonnoc Beach and Elephant Island is unclear (Does Lonnoc share Elephant-Island-derived revenues with Elephant Island owners?). We would like to quietly investigate these issues before approaching the principals at Lonnoc and Elephant Island to seek their cooperation in the development of this enterprise.**

Malakula Ringi Te Suh Reef Restocking Project

Situation: A small marine conservation area was established by community members with no outside prompting or support. A community representative called on PEP to request assistance with

information and further development ideas. The Maskelynes area is noted for over-exploitation of near-shore resources due to population pressure and absence of management. Because of rough seas and scarcity of deep-water boats, villagers are heavily dependent on near-shore resources for protein. The conservation area is a privately owned reef-flat that has been restocked with giant clams.

Conservation Objectives: To protect the initial efforts of villagers, encourage continued protection of the area, improve efficacy of the reserve to restock other areas, add additional organisms to those protected and produced in the reserve, assist with reserve management.

Enterprise Intervention: This is a subsistence-economy effort. The villagers would like eventually to have enough marine produce to sell, but that is a long-term endeavor.

**Recommendation September, 1993: PEP should provide technical assistance to support and encourage this meritorious community initiative. A partnership with the Environment Unit has been discussed and seems a promising approach that may ensure continued attention to the area. Because of limited enterprise potential, this area has not been chosen by PEP staff as a full-blown EMU.**

Malakula Bonvar and Benvat Crab Project

Situation: These villages asked PEP for assistance in establishing a protected area for crabs. Crabs were abundant in the past, but have become scarce. The situation here is very similar to that of Ringi Te Suh (which is close by), with over-exploitation of nearshore resources due to population pressure and absence of management. Because of rough seas and scarcity of deep-water boats, villagers are heavily dependent on near-shore resources for protein.

Conservation Objectives: Provide management and conservation options for re-establishing crabs and other marine organisms; habitat protection.

Enterprise Intervention: Like Ringi Te Suh, this is a subsistence endeavor with villagers hoping eventually to produce organisms for sale.

**Recommendation September, 1993: PEP should provide technical assistance to support and encourage this community initiative. A partnership with the Environment Unit should be discussed; this may ensure continued attention to the area. Because of limited enterprise potential, this area has not been chosen by PEP staff as a full-blown EMU.**

Efate Waste-Oil Project

Situation: There is no program in Port Vila (or Vanuatu) providing for the disposal of used lubricating oil (waste oil) in an environmentally acceptable way. It is believed that a local utility uses 60,000 liters of lubricating oil per year. In addition,

unknown amounts of lubricating oil are imported to service motor vehicles, construction equipment and the like. Disposal of this waste oil is by dumping it onto the earth.

Vanuatu's Energy Unit is enthusiastic about this project, and has offered to undertake a preliminary survey of waste-oil "producers" and potential purchasers.

Conservation Objective: To prevent the waste oil from being dumped improperly.

Enterprise Intervention: Working with the utility and other producers of waste oil, PEP proposes to develop an enterprise that would collect and market the used oil.

**Recommendation March, 1993: Continue to evaluate feasibility of this project.**

**Status September, 1993:** During the RDO/SP-FSP meetings of March and April, 1993, the then RDO/SP Science Advisor declined to approve continued activity in this area. PEP staff feel that this project has considerable enterprise and conservation merit and would contribute to the range of linkages addressed by PEP. In August, the Enterprise Specialist again discussed this proposed project with the RDO/SP Project Officer, and asked for approval to continue to study the recovery and sale of waste oil. This approval was granted. Preliminary discussions have been held with Vanuatu's Energy Unit; they enthusiastically support the concept.

**Recommendation September, 1993: PEP should continue to advance this initiative, To further define the project, seek information regarding waste oil "producers" and potential customers.**

Malakula Nangai Nut Project

Situation: Charles Rogers of Vanuatu's Farmers' Support Association (FSA) approached PEP for assistance in developing an enterprise to process and market nangai nuts.

Conservation Objectives: Conservation of the forest and optimized use of forest resources by utilizing a non-timber forest resource.

Enterprise Intervention: Collection, processing and packaging of nangai nuts. Rogers and FSA would provide solid management for this project. Demands upon PEP's resources would be minimal. A purchaser of the product has been located. If successful, replication of the enterprise would be relatively simple.

**Status September, 1993:** Rogers is to submit a business plan and financial data for PEP's review.

**Recommendation September, 1993: Upon receipt of business plan and financial data, evaluate feasibility. If the outlook is positive, proceed with an IEE.**

Santo Matantas Conservation Project

Situation: An area of old growth forest adjacent to the seashore was identified. It was known that there was pressure to log this forest. Local people expressed an interest in developing tourism as a source of cash income.

Conservation Objective: To conserve this unique old growth forest.

Enterprise Intervention: In exchange for agreeing to preserve this forest, PEP proposed to help the local people develop a tourism project. Income from tourism activities would replace that lost from the sale of logging rights.

**Recommendation April, 1993: Subsequent investigation revealed that the village chief in Matantas had executed a logging contract for the area. In addition, because of the remoteness of the location and the lack of unique features to attract tourists, the probability of commercial success was judged to be low. We do not intend to pursue work in this EMU.**

**Status September, 1993:** The logging contract was withdrawn. New Zealand Forest and Bird Preservation Society (NZFBPS), the Melanesian Forest Expedition, and Gov. Vanuatu (Environment and Forestry) have all continued to inventory the biota and pursue plans for a reserve. NZFBPS sent Grant Rosoman to evaluate potential income-generating schemes in August, 1993. Rosoman and Bani are to produce a draft set of recommendations for resource management and income generation during this month. Confirming PEP's findings, Rosoman reports very limited enterprise potential. The only possibility he discovered is the gathering and processing of edible nuts found within the forest. Rosoman will investigate the viability of this enterprise; we have left it that if this (or any other concept) shows good promise, we will consider a partnership with them. We agree that the people of Matantas enjoy an easy life, and that the entrepreneurial spark is not found within the community.

**Recommendation September, 1993: Barring a positive recommendation from the NZFBPS, we do not intend to pursue this Project.**

Country 2, Papua New Guinea
EMU 1, Lasanga Protection Programme Project

Dr. Devoe has contact with three separate ongoing projects in PNG. A component of each is an effort to establish enterprise responses to local environmental threats. PEP has been invited to participate in each of these working in concert with existing staff. The projects are:

Lasanga Island, the Lasanga-Lake Trist Conservation Area.

Situation: For approximately four years, PNG's Village Development Trust (VDT) has been working with communities in the area to develop environmentally sound income generating projects that will provide alternative sources of revenue for villagers. Specific problems are destructive fishing practices that are destroying local reefs and destructive logging.

Conservation Objective: Preservation of coral reefs, support of the overall Lasanga-Lake Trist program encompassing forest and wildlife conservation, development of the Lasanga-Lake Trist application for Wildlife Conservation Area designation.

Enterprise intervention: Development of a tourist activity, in this case, a snorkeling "nature trail", to provide an alternative source of reef-based income. This project will also contribute an assessment of reef community biodiversity, sought to support application of this area to the PNG Wildlife Conservation Area program. We would also like to explore improving the existing fisheries business.

**Status September, 1993:** The Enterprise Specialist and RDO/SP Project Officer visited the VDT and Lae and toured the Lasanga area in August. The previously described situation was found to be much altered.

Development of tourist activities are no longer of immediate interest to the VDT and residents of the Lasanga area. A German Development Program (GDP) program to provide funding and expertise for the construction of tourist facilities has been abandoned. A result of this is that there is no longer interest in marine-recreation-based tourism enterprise. The previously requested marine biodiversity assessment is no longer wanted.

VDT and the people of Lasanga now express their firm support for a PEP project that would enhance an existing near-shore fishing project. Income potential from such an enterprise is good, and there are Government and NGO programs that would support a fishing project.

There is concern regarding the viability of VDT; both funding and management may be thin.

**Recommendation September 1993:** The viability of VDT is to be assessed. PEP should continue to develop the Lasanga EMU. Priority is to be given to: a) developing a detailed and mutually acceptable project plan, and b) providing for optimum project **staffing.**

Extra-EMU Activity

Hiri East Coastal Zone Management Area Project

Situation: Hiri East is a 50 km strip of coast immediately adjacent to Port Moresby. PNG's Department of Environmental Conservation (DEC) has an ongoing project to establish the Hiri East Coastal Zone Management Area as a formal Wildlife Management Area to facilitate conservation of the area's natural resources. PEP has been asked to support this effort in two ways; 1) perform a market study to optimize the financial return to Hiri East fishermen, and 2) fund of all or part of a study entitled "Investigating the Impacts of Fishing on the Marine Resources of the Proposed Hiri East Coastal Zone Management Area". This study is requested as a prerequisite to the establishment of a Wildlife Management Area.

Conservation Objective: To support DEC and the people of Hiri East in their desire to establish a Wildlife Management Area.

Enterprise Intervention: A market study to assist the existing fishing enterprise would lead to better utilization of the primary natural resource in Hiri East. The enterprise role in support the study of the marine resources would be minor to non-existent.

**Recommendation September, 1993: The Conservation Biologist and Enterprise Specialist should meet with PNG's DEC to further explore these opportunities.**

Kakoro-Kunamaipa Wilderness

Situation: Located 120 km. north-east of Port Moresby, this area is an uninhabited tract of undisturbed humid forest exhibiting a very high level of biodiversity. The area is threatened by commercial logging activity. Initially supported by the Smithsonian Institution's National Museum of Natural History, a research station has been established in the area. It is envisioned that a formal integrated conservation and development program will be established, and that a part of this effort would be an enterprise development scheme providing a "pay off" to landowners to help them resist the lure of logging companies.

Conservation Objective: Preservation of an area of great biodiversity and undisturbed forest.

Enterprise Intervention: Development of enterprise activities to provide an alternative to income from logging.

**Recommendation March, 1993: The Kakoro-Kunamaipa Wilderness Project is in its infancy. It is not believed that there is sufficient time for PEP to work effectively with this project to a positive outcome. We will continue to monitor this situation.**

**Recommendation September, 1993:** No further activity is proposed.

Crater Mountain Project

Situation: Located in the Central Highlands of PNG, Crater Mountain is a 2900 sq. km, remote area of pristine mid-to-high-elevation rain forest rich in floral and faunal diversity. Supported by the Global Environment Facility and Integrated Conservation and Development programs and FSP/PNG, a project has been established to protect this forest resource. A component of the program is to develop small-scale, income-generating projects to support forest conservation.

Conservation Objective: Conservation of an undisturbed tropical rain forest.

Enterprise Intervention: Working through U.S. Peace Corps volunteers at this site, small scale enterprises would be developed to provide an alternate source of income to local villagers. Handicraft sales, poultry production, fish ponds, coffee growing, and other activities have been suggested by the villagers.

Comment: The remoteness and almost total absence of an economy do not bode well for successful enterprise development at Crater Mountain. However, the presence of the Peace Corp Volunteers are a positive factor and the potential conservation gains very great.

**Recommendation March, 1993: Establishing profitable enterprises in this EMU will be difficult. We will rank this EMU with other potential sites and select based on the likelihood of tangible results in 30 months. We will continue to monitor this situation.**

**Recommendation September, 1993:** No further activity is proposed.

Country 3, Kingdom of Tonga
Extra-EMU Activity

Ha'atafu Flyingfish Fishing Project

Situation: Ha'atafu Surfing Resort is located on the northwest extremity of Tongatapu, and is adjacent to a designated marine reserve. Employees of the owner fish a seamount lying 2 km off-shore. Fish caught are used in the resort's kitchen, with the surplus sold to restaurants in Nuku'alofa. This seamount, as well as near-shore shallow waters are heavily fished, and reef stocks are depleted. The presence of large populations of flyingfish have been noted just beyond the fringing reefs, 100 m or so off the beach.

Conservation Objective: To reduce fishing pressure on overfished reefs and shallow-water fisheries by developing a flyingfish fishery to utilize this neglected resource.

Enterprise Intervention: Using fishermen, boats and motors currently employed, and with the procurement of a limited amount of specialized equipment, establish a flyingfish fishery. This enterprise would be managed by the resort owner (who manages the existing fishery).

**Status September, 1993:** An IEE has been prepared and forwarded to USAID for approval.

**Recommendation September, 1993: If and when the IEE is approved, procure the necessary specialized equipment. Develop a business plan and monitoring and evaluation procedures. Initiate the enterprise. Investigate the possibility of other interventions involving the marine reserve.**

Country 4, Solomon Islands

Morova Lagoon Project

Situation: Peter Hunnam of WWFI directs an ongoing project at Marova Lagoon in the Western Province, Solomon Islands. The purpose of this project is to develop community-based resource management.

Conservation Objective: Conservation of the local resource base and preservation of biodiversity.

Enterprise Intervention: Working with resident WWFI project personnel, develop locally based enterprise(s) that both support conservation objectives and provide cash income.

**Status September, 1993:** Reports on biodiversity and potential PEP partnerships make this seem a promising area for PEP work. However, the loss of FSP's MOU with the Solomon Islands Government has put consideration of this site on hold. We are waiting for re-negotiation of FSP's MOU.

**Recommendation September, 1993: If FSP's MOU is re-negotiated in a timely fashion, and if PEP's slate is not full at that time, and if it is clear that PEP can proceed without undue hindrance in the Solomons, we will move to scoping there. This is viewed as a low priority project.**

# APPENDIX II

## FIRST ROUND OF CONSULTATIONS IN LOLIHOR

An Interim Report on the work of the Community Liaison Officer of the Profitable Environmental Protection (PEP) Project of the Foundation of the Peoples of the South Pacific (FSP) in Lolihor, the North West Ambrym Ecological Management Unit (EMU).

By: John D. Salong, PEP Community Liaison Officer

**ACKNOWLEDGEMENTS:**

This report is a result of cooperation of all the men, women and children of Lolihor. Acknowledgement and gratitude is due to the chiefs and the elders who welcomed the consulting team to their villages. All the leaders of the community are owed gratitude for assisting in drawing people together for the consultations.

Special thanks is due to members of the "WUHURAN THEATRE GROUP" who patiently travelled around all the settlements, usually at night, performing the play "VELEJ LAEF", facilitating discussions and recording the proceedings. The group members are: George Bumseng (Director/Musician), and actors Harry Bongto, Emma Wendy, Rahmanman Kintor, Jack Bongnaim, Toren Bongnaim, and Taso John.

Special gratitude is also owed to all the community members who made time to attend and participate in the consultations in spite of their demanding schedules.

1993, unlike the past three years, has been a year of plenty. The yam harvests outside of the EMU have been exceptional. And taro harvests have been good all over the area of North Ambrym. This has sparked a lot of trading and sharing in the traditional ceremonies of marriage and circumcision. These ceremonies take up a lot of community time and expend a lot of private wealth. They demand participation of all families and reinforce the traditional ties of rights and obligations. This year has set a record so far in the number of ceremonies that have been performed and those that are still planned.)

Last but not least, special thanks and acknowledgement must be made to the understanding, flexibility and support of Dr. Nora Devoe, PEP Project Manager. Dr. Devoe has supported experimentation with Popular Theatre as a tool of dissemination and collection of information. She has also been extremely understanding in allowing the processes of awareness in Lolihor to be controlled and owned by the People of Lolihor.

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**INTRODUCTION:**

This report comprises information gathered from the people of Lolihor in North Ambrym, during a series of community meetings after the play "VELEJ LAEF" by the "WUHURAN" popular theatre group. The meetings were to gauge the different communitys' willingness to cooperate around the issue of "environment". This would cast a broad outline to set the interventions of the "Profitable Environmental Protection Project (PEP) of the Foundation of the Peoples of the South Pacific (FSP). In so doing, any PEP intervention that went through the Environmental and Enterprise loops would have genuine grounding in community aspirations in the North West Ambrym EMU.

Most community meetings were held where the population is settled in the evenings; - between 6:00 pm and 11:00 pm. This proved to be most appropriate because the audience did not have to go very far from their houses. And 6:00 pm onwards has traditionally been the time for "rowhuran", or formal teaching by the elders. (This has changed since the introduction of kava into the North Ambrym culture).

Monday and Friday evenings were avoided because of Monday meetings held weekly to discuss village matters, and Friday Youth Fellowship also held weekly as part of Presbyterian and Holiness Fellowship programs.

The program of meetings was written out and posted in all eight settlements in strategic locations at least four days before the actual meetings. This program took into consideration all the ceremonial times that had been scheduled. Then, there was follow up with the community leaders to see if the schedules were free of conflict. Where necessary, re-arrangements were organized.

Although Lolihor has five main villages, thirteen separate meetings were held. The first meeting was held back on June 14th with the people of Faramsu and Ranvetlam, followed by two meetings with people of Ranon and Fanrereo on Tuesday June 14th. In these three meetings, it was generally agreed that there should be a series of general meetings to draw together all the people of Lolihor. A tentative date of July 6th was set, but had to be postponed because of preparation for a marriage ceremony at Fanrereo, a circumcision ceremony at Fansar, Ranon and fundraising day at Fanhomol, Ranon.

The ten important meetings with the communities were held between July 13th and August 2nd 1993.

On the occasion of the Youth Fellowship combined service and of the Presbyterian Church on Tuesday July 13th 1993, the first round of consultations in Lolihor was launched at Ranvetlam.

The session was opened with a welcome and an opening prayer. Then there was a quick introduction of the subject based on the background meetings and an outline of the procedure for that particular meeting. Then everyone was asked to relocate and sit in a circle on the grass under the breadfruit trees. (Everyone had been asked to come with anything that represented what the word "environment" meant to them).

Every person who brought something as a symbol of the environment displayed his/her object to the whole group and gave an explanation of why he/she thought the object represented the environment. (see previous report). Then participants deposited his/her object in the centre of the circle.

When everyone had taken a chance to speak, the WUHURAN theatre did a quick sketch which identified the different interest groups in Lolihor that has a stake in the environment. The stakeholders had a dispute over whose rights were supreme and fought over the environment. In the ensuing struggle, they destroyed the environment deposited by the audience in the centre of the circle. They were told to work together and they complied. But, once damaged, the symbolic environment was impossible to repair.

After the sketch, there were eight small group discussions to address three questions: I) what is the environment II) who benefits from a healthy environment <u>or</u> who suffers if the environment is damaged and III) how do we protect the environment of Lolihor. The eight small groups each took the perspective of the identified stake holders in addressing the questions. The stake holders were: the government, churches, chiefs, landowners, migrants, women and youth. After the small group meetings, there was a plenary to report on the meetings. This was followed by a summary and an outline of the program of further consultations.

In the meantime, the WUHURAN THEATRE GROUP, was rehearsing for the play 'VELEJ LAEF".

The play has three main characters who leave the village and go to Port Vila. Initially they are happily surprised by the change. But soon they find they cannot cope with town life. Their relatives in Vila are not very happy that they have to care for the three in addition to those they are already obliged to support.

This prompts each of them to explain why they have come to town.

The first character to explain her predicament is a women with a small baby. She explains why she wants her baby to have good health. She then shows that this is not possible in the village because she cannot even get her child weighed or inoculated because the clinic has been closed due to a land dispute between the self-declared land owners.

Then she prompts the second character by asking why he has come to Vila.

He explains how they used to have an excellent water supply system in the village. When new, the water committee took very good care of the water supply system. But soon the committee disintegrated because the chairman had joined a new political party and the plumber had joined a new christian denomination. This division led to the neglect and breakdown of the water supply system, which results in the lack of water in the village. This is why he has left the village.

The third character used to be the chief of a village. He explains how his village owned a big healthy reef system, with lots of shells and fish. He allowed people to use it. But pretty soon he

could see that overfishing was killing the reef.

He decided to put a taboo on the reef to allow the reef to regenerate itself. The villagers did not respect his taboo and wanted to beat him up. He tried to explain that people needed money and food to live but this had to be balanced with the life of objects used for food and money.

The people defied his authority on the grounds that the church they had joined did not accept his authority. So he left.

The play ends with a question to the audience as to what can be done in their villages to ensure that these three characters can come back and meet their aspirations in the village.

The first performance of the play was to an audience of eighty five men, women and children of Fanrereo at the Fanrereo Presbyterian church on Sunday July 18th 1993. Prior to the performance, there was a welcome and a prayer from an elder of the church. Then the PEP Community Liaison Officer set the context of the meeting based on preceding meetings and what would happen in the future. This was followed by an outline of that particular meeting including an explanation of questions to be answered by the audience. There was a report of the discussions at Ranvetlam on July 13th 1993. Then the WUHURAN THEATRE GROUP gave their performance.

After the performance, the audience was split into four discussion groups. The groups discussed a set of seven questions as a test. Because of the limited space and the problem of having only one Coleman light, discussions were not as broad based as expected. But there was keen interest and participation from the opinion leaders of Fanrereo. The small groups reconvened to give reports. Then there was a summary and a single group discussion until 11:00 pm that evening, when the session was closed with a prayer.

At the quick evaluation meeting after the meeting with the Wuhuran Theatre Group, it was indicated that the questions were too detailed. It would be better to allow freer flow of discussions. So the questions (see appendix) were reduced from seven to three.

It was understood that Monday meeting in Fanla village are held in the mornings. As such, on Monday July 19th, 1993, the Wuhuran Theatre Group went to perform in the village of Fanla. It was raining and the church used for the meeting was not big enough to accommodate the play.

After the welcome and opening prayer by an elder of the village, the PEP Community Liaison Officer set the background context of the meeting. Then he gave an outline of the current meeting and explained the questions that would be asked after the play. He then went on to report on the findings at Ranvetlam and Fanrereo.

The rain stopped long enough for the WUHURAN THEATRE GROUP to perform their play outside. Then it rained again. As a result, there was only one discussion group.

The participation in the discussions was great. It would have been even richer had chief Tofor attended. He had sent his regrets because his foot was swollen. The meeting closed around 10:45 pm

with a closing prayer.

On Tuesday July 20th, the Theatre Group went to the village of Faramsu. The meeting was held in the open because there is no church or meeting house in the village. The meeting was opened with a welcome and a prayer from the elder of the village.

Again, the PEP Community Liaison Officer set the context of the meeting and gave a report of findings in Ranvetlam, Fanrereo and Fanla. Then he clarified the procedure of that meeting and explained the three questions that would follow the play.

The performance was followed by four small group discussions. Then there was reporting in the larger group. This was followed by a summary and an outline of what would be done with the findings in the future. The meeting was closed at 10:15 pm with a closing prayer.

This procedure was repeated at Ranvetlam on Wednesday July 21st, Ranon on Thursday July 22nd, Ranbe on Saturday July 31st, Lonbe on Sunday August 1st and Ranvu on Monday August 2nd. This was in spite of Monday meetings because the Ranvu community does not have a chief and do not hold Monday meetings.

There were three more performances without group discussions and a meeting without any performance; on Saturday July 24th, at Ranon High School, Monday July 26th, for Children's Day celebrations at Ranon, and Tuesday July 27th, for the Thirteenth Independence Anniversary celebrations at Nopul. At these performances, the children were taught two songs about litter and keeping Vanuatu beautiful. On July 27th five video cassettes were also screened and there was a meeting with local politicians.

The attendance at each of these performances were as follows: Ranvetlam, Tuesday July 13th: 25 people; Fanrereo, Sunday July 18th: 85; Fanla, July 19th, 35; Ranon July 22nd: 30; Ranon High School July 24th: 30; Children's Day Celebrations July 26th: 150; Independence Celebrations July 27th: 180; Ranbe July 25th: 20; Lonbe August 1st: 16; Ranvetlam July 21st: 35; Faramsu July 20th: 33 and Ranvu August 2nd: 45.

**REPORTS**:

What is the environment?

At the first meeting in Ranvetlam village, the group discussions identified the environment as: everything around us including everything in and on the land, everything in the air and the sea. Specific examples of the environment were: the bush, wind, the air, water, food, life itself, gardens, cabbages, firewood, children, houses, beds and even baskets.

The environment also meant the future and local concepts that are similar to respect. In the language of North Ambrym "ngeli", it was reported that there are many sub-categories of respect that could be synonymous with the environment. These were "terfonan", meaning to look after well, "tangtitian" meaning to keep carefully, and "rongtafanan", meaning to hear well and humbly accept. "Rongtafanan" is different from "Rontaan", meaning to

hear. "Rongtaan" does not necessarily mean acceptance of what is heard. This is again different from "Harlengan", meaning to listen. To listen does not necessarily mean something is heard.

Still to the question of what the environment is, the people of Fanrereo village added to the list of definitions generated stating that the local language was part of the environment. They also added that the ways of the ancestors who lived and practiced respect was part of the environment.

The people of Fanla added a long list to the definition of the environment. These were: "goran", "rowhuran", "konan", "mlalian", "Buluim", "Bulfatao", "Rengesese", "Wuhuan", "mel", "har", and "yafu nyer".

"Goran" is a set of rules that governs behaviour in relation to "in-laws", "newphews" and "nieces". These rules are a sign of respect where one cannot be informal with such relatives. According to the people of Fanla this was an integrated part of the environment.

"Rowhuran" means to teach and describes people sitting together to learn history and values from orators. This was part of a healthy environment because without teaching there would be no meaning, and without meaning, there would be no life.

"Konan" is again a set of rules governing behaviour in relation to "Yafu nyer". These rules are especially applicable when high ranking people have sacred fires or "fangkon". When a person is on "fangkon" or sacred fire, he cooks his own food, eats only from what he produces himself and has fruit trees that nobody else can eat from. These people can also make whole areas sacred or "Orkonkon" such that people cannot go into an area. These rules were integral to a healthy environment according to the people of Fanla.

"Mlalian" refers to taboos that can be signified by the wild kava leaf. This taboo is a common property and is not restricted in use. But the rules is that all fruit trees that have a "mlali" have to have their first fruits picked by the daughters of that piece of land who are married to another piece of land. The rest of the fruit is then shared by everyone.

"Bulfatao" literally means the mouth of the house. It refers to the family. Again there are a set of rules to live by depending on the size of the "Bulfatao". If someone comes from a big bulfatao, s(he) is from a family of high ranks. By that virtue, they have different rights and obligations to someone from a small"Bulfatao".

"Rengesese" literally means feeling. It refers to the traditional calendar and seasons. The change in seasons are symbolised by the flowering, fruiting and budding of plants. These seasons also indicated the need to change human behaviour. For example, when the yam is growing, people are obliged to put their bows and arrows into storage. If people go into the interior of Ambrym, there will be acid rain which will destroy the yam crop. If they go fishing, there will be big waves which will bring salt to the gardens through the air and destroy the yam crop. When the yam is harvested people are then allowed to hunt and fish. But even in

hunting and fishing season there are exceptions when some person has "kone" the things being hunted or fished.

"Kone" means protected with magic such that there will be more. Once the magic spell is taken away by the person who does the "kone", then hunting season is open again.

"Wuhuan" means to ask. But wuhuan here means that something being asked cannot be refused. So the responsibility is on the person doing the request to be considerate and fair. Again there are rules governing this behaviour.

"Buluim" means the door of the house. The house here means the family. Every person comes from a family and every family has a piece of land from which they originate. All the daughters of that house have to marry out and a called "metahals" or "best keepers of the path". This means that one cannot travel unless their destination is where there is a daughter of the land. The sons of the land are the "Bari vanten", meaning that they have their roots in the land.

Both "bari vantens" and "metahals" have rights and obligations prescribed by traditional rules.

"Mel" is the traditional long house where "rowhuran" or traditional teaching takes place. It is also the executive and legislative seat of traditional government. There are sacred "mels" where only "yafu nyer" can enter. And there are normal "mels" where only women are prohibited from entering.

"Har" refers to a clearing on the land where all ceremonies and public shows take place. It is the peace clearing where there cannot be violence of any kind. The "har" is where "yafu nyer" can preach to their followers. It is also the place where yafu nyer can dictate to the people. The "har" is also the supreme court where all judgements are upheld and not appealed.

"Yafu nyer" literally means "the gods". It refers to leaders, but particularly traditional leaders who have acquired rank and prestige through traditional rites of passage. All traditional leaders or "yafu nyer" have rules and obligations to live their lives by.

All the concepts were seen to be important parts of the environment by the people of Fanla village.

In addition to these, the people of Lonbe wanted to add the concept of "temar" or peace as part of the environment. They outlined that traditionally, "yafu nyer" could rule that there would be universal peace and brotherhood. These rules would be sealed by the killing of pigs and all people were bound by this rule.

Who benefits from a healthy environment or who will suffer if the environment is destroyed?

To the question of "who benefits from a healthy environment, everyone agreed to the following which were written down by the people in the first meeting on July 13th on the occasion of the combined Youth Fellowship of Lolihor, at Ranvetlam. They stated

that; everything in and on the land, in the sea and in the air benefits from a healthy environment. All living creatures benefit. All the people and their organizations benefit, including; the churches, the chiefs, political parties, the governments, the women, the migrants and the youth all benefit from a healthy environment. All these would suffer if the environment was destroyed.

Most importantly, "yafu nyer" (the gods) and "bari vanten nyer" (people with roots into the land) benefit from a healthy environment.

What do people in Lolihor want to do to maintain a healthy environment?

At the first meeting on July 13th at Ranvetlam Presbyterian Church, those who were there had the following to say.

1. Have respect for "bari vanten nyer" (people with roots into the land)". "Bari vanten nyer" must understand and exercise their rights and obligations.

2. work together with the different levels of government, the youth, the women, the chiefs and the churches

3. Obey all leaders: leaders understand their rights and responsibilities.

4. Do environmentally friendly business.

5. Alter gardening methods to ensure fallowing is sufficient.

6. Re-organize to ensure manageable workloads.

7. Think carefully about our needs, wants and manage expectations for the future.

8. SHARE.

9. Look carefully at development - what kind of development is needed in Lolihor.

10. Have a comprehensive collective plan understood by everyone on how to manage the land, the air and the sea resources.

This list was added on by the people of Fanrereo who stated that:

11. "ktu muran mena yafu" - take on the life of God.

12. "wuhur mole rongtafanan, terfonan, Konan a tangtitian". Teach, learn and practice the laws of respect as defined by local laws under concepts of "Tangtitian", "Rongtafanan", "Terfonan" and "Konan".

13. Ensure that every single person has a piece of land. Every child must have a father to inherit land from.

This list was then taken to Fanla where extensive additions were made. These additions were:

14. "Wuhur mole rongtafanan, terfornan, tangtitian, tengnean, goran, konan, wuhuan, rengesese a saroan, rowuran ne mel a har". Teach, learn and practice the laws of "mel" (long house) and the "har" (peace clearing) that governs local concepts such as "Tangtitian", terfonan", "rongtafanan", "Tengnean", "goran", "Konan", "wuhuan", "rengesese" and "soran ne mel on har".

15. Find yafu nyer (Gods) that are not selfish and are humble to be leaders.

16. Bring back the local concept of "Saroan a wuhuran where orators transmit and broadcast values, laws and history.

17. Teach, learn and practice the ties of the "Buluim" "Bulufatao".

18. Understand that "ruan" - the local concept of "being" used to be easy and simple as compared to this day. For example, many ceremonies were not as expensive as today.

19. Regulate the use of kava which is a main deterent for "wuhuran" - the local concept of teaching, learning and practice.

20. Teach, learn and practice "rengesese" - the concept of being in tune to the surrounding where, growth, flowering and other signs are interpreted to mean human behavioural changes.

21. Bring back, build and revitalize the "mel nyer" (long houses) and "har nyer" - the peace clearings.

22. Understand that "wuan" - the local concept of "good" or "right" or "justice" was in the culture before the introduction of organized religion.

These were added on to by the people of Faramsu village who stated that:

23. A strong set of laws should be prepared to govern the people of Lolihor.

24. People should pray to God to appoint a leader that would unite people.

These were again added to by the people of Ranvetlam who stated that:

25. The re-organization of Lolihor as a working unit with its organizational plan, structures, policies and procedures should have endorsement from the Vanuatu Christian Council and the Malfatumauri - the National Council of Chiefs.

26. Have some elders become teachers of "ruan ne orbesau" - the laws, and regulations of the long house and the peace clearing.

27. Support the chiefs. If more of the chiefs' time is dedicated to administering the wellbeing of villages, their subsistence base - the gardens - must be maintained with assistance from all villagers. (There may be some neglect of their gardens, the subsistence base.)

28. Have some way of screening new ideas.

29. Cut down the numbers of leaders and organizations.

This list was added on by the people of Ranon who stated that:

30. The youth must have a forum where their particular needs are heard and respected.

31. There must be rule of law; - a justice that sees everybody as equal.

32. Have people delegated as "village police".

33. Have leaders who are worthwhile or who have clean records such that they can be respected.

34. Have a police station at Nopul so that those who defy chiefs can be put into the hands of the formal law.

The people of Ranbe added that:

35. People of Lolihor had to take some time to walk the boundaries of all the land in the EMU such that there would be public knowledge of all land and their ownership.

36. All the chiefs had to be from the land such that each chief could speak with authority from his "har."

This list was added on by the people of Lonbe who stated that:

37. Parents had the primary responsibility to teach their children rules to live by such that the environment could be protected.

38. Leaders had to be role models in keeping of rules.

39. Leaders had to be kind and respectful of the needs of people.

40. "Tatagroan" - the concept of sealing every rule by killing pigs, had to become the norm.

41. There had to be a meeting of everybody in Lolihor to give opportunity for every leader to speak.

42. People of the land had to agree to work together.

This was finally added to by the people of Ranvu who stated that:

43. The chief had to be from the land, but also be fair, impartial and just.

**CONCLUSION:**

All these recommendations indicate that there is still hope in Lolihor that what is seen as the environment can be protected. It is also clear that "environment" is more cultural than biological. And the starting point for any intervention is to seek consensus from all the people of Lolihor, including the people with roots in the land, the churches and political parties and chiefs, the women, the youth, the children and the immigrants on specific actions drawn from the recommendations.

The discussions also indicated that people in the area need more awareness. There needs to be more education such that they understand government systems, the education system, the judicial system, organized religion and other international development that set the global context for what is happening in the EMU. The awareness also needs to concentrate on traditional knowledge and traditional systems. Moreover, there needs to be specialized training for the leaders, especially the chiefs. And scientific information is needed to supplement the basic beliefs.

To be able to achieve these the first step would be to have copies of this report sent to the church leaders, the chiefs, the women leaders, the landowners, the youth leaders and the political leaders, and the leaders of migrants separately. Each of these groups will be asked to meet around the issues raised to get recommendations.

From these, there needs to be a second round of consultations to hear reports from the leaders and reflect on them. Then there should be a detailed plan to follow with all the mission, the objectives and strategy programs and procedures.

With this plan, the ecological management unit can then be managed such that it fits both PEP's mission and the mission of the people living in Lolihor.

*Appendix A*

Questions

1) What is "Environment?"

2) Who benefits from a healthy environment?
or
who would suffer if the environment is destroyed?

3) What can we do in the area of Lolihor to ensure a good life and at the same time, protect the environment?

*Appendix A2*

Questions after the play

1) What was shown in part I of the play "VILLAGE LIFE?"

2) What was shown in Part II of the play "VILLAGE LIFE?"

3) What was shown in Part III of the "VILLAGE LIFE?"

4) Do the problems shown in part I of the play occur in Lolihor?

5) Do the problems shown in part III of the play occur in Lolihor?

6) Do the problems shown in part III of the play occur in Lolihor?

7) What can be done by the people of Lolihor to solve the problems discussed in part I of the play village life?

8) What can be done by the people of Lolihor to solve the problems discussed in part II of the play village life?

9) What can be done by the people of Lolihor to solve the problems discussed in part III of the play village life?

*APPENDIX A3*

Revised Questions

I. What was shown by part I, II and III of the play village life?

II. Do we find such problems happening in Lolihor?

III. What can the people of Lolihor do to solve these problems?

*APPENDIX A4*

Theatre Group Program

In Lolihor, we now have a theatre or concert group which will be working to help us think through issues such as the "Environment".

Their first play is called "village life" and tries to help people of each village think through the problems of our villages today.

This play will be taken by the theatre group to every village and will be performed in the evenings. After the play there will be discussions to hear the thoughts of the men, the women and the youth.

Appeal goes to everyone to come and participate the program as follows:

| PLACE | DATE | DAY | TIME | |
|---|---|---|---|---|
| FANREREO VILLAGE | 18-07-93 | SUNDAY | 6:00PM | |
| FANLA VILLAGE | 19-07-93 | MONDAY | 6:00PM | |
| FARAMSU VILLAGE | 20-07-93 | TUESDAY | 6:00PM | |
| RANVETLAM VILLAGE | 21-07-93 | WEDNESDAY | 6:00PM | EVERYONE |
| RANON VILLAGE | 22-07-93 | THURSDAY | 6:00PM | IS |
| RANON HIGH SCHOOL | 24-07-93 | SATURDAY | 7:00PM | WELCOME |
| RANON HIGH SCHOOL | 26-07-93 | MON. CHIL | 3:00PM | |
| NOPUL AREA COUNCIL | 27-07-93 | TUE. INDP | 1:30PM | |
| RANBE VILLAGE | 31-07-93 | SATURDAY | 6:00PM | |
| LONBE VILLAGE | 01-08-93 | SUNDAY | 6:00PM | |
| RANVU VILLAGE | 02-08-93 | MONDAY | 6:00PM | |

# APPENDIX III

## WILD YAM CULTIVATION IN VANUATU

A Case Study Of Wild Yam Cultivation In Lolihor, North Ambrym;

The Environment Management Unit (EMU)

of the

Profitable Environmental Protection Project (PEP)

of the

Foundation for the peoples of the South Pacific (FSP).

By Suliana Siwatibau

A report of a short term assistance contract on traditional agricultural practices associated with wild yam cultivation in the EMU.

DISCLAIMER: The opinions expressed here are those of the author and do not necessarily reflect the views of FSP.

ACKNOWLEDGEMENT

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Mr. John Salong and his family for their generous hospitality and for facilitating the field work.

Information gathered during the field work were obtained from personal interviews of individual wild yam cultivators as follows:

Mr. Simion Salong of Henyal-Orokon Settlement
Mr. Willie Salong of Henyal-Orokon Settlement
Mr. William Fred of Faramsu Village
Ms. Neli Bili of Ranon Village
Mr. and Mrs. Silas Toni of Fanrereo Village

In addition to personal interviews, three separate group interviews were held with a group of men from the EMU, a group of young men and young women from Ranvetlam, and Faramsu, and a group of women from the whole EMU. I am grateful to John for arranging these meetings which were useful in gauging the community's general attitude towards wild yam cultivation.

The interviews were held with prepared questionnaires, samples of which are attached as Annexes I and II. Information on the different varieties of wild yams was recorded on prepared field sheets a sample of which is attached as Annex III.

The author had to take regular walks to the bush to observe wild yam plots and make field notes on characteristics of wild yam varieties. John Salong, Willie Salong, and William Fred were willing and patient guides.

WILD YAM CULTIVATION IN VANUATU - A CASE STUDY IN NORTH AMBRYM

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# WILD YAM CULTIVATION IN VANUATU

## A case study of the Lolihor region in North Ambrym

## INTRODUCTION

This report was compiled from information gathered during one day's work at the library of the University of the South Pacific in Suva and one week's field work at the Environment Management Unit (EMU) site of the Profitable Environment Protection Project (PEP) of the Foundation for the Peoples of the South Pacific (FSP). It is presented in fulfilment of the Terms of Reference (TOR) of a short term consultancy which required the following products:

(1.) A one-page report on an initial environment examination of the site proposed for wild yam cultivation.

(2.) An annotated bibliography of materials treating wild yams in Melanesia.

(3.) A written report detailing the following:

Cultivation and harvesting including propagation, planting, tending, and timing of operations.

Land ownership, site selection and rotation.

Labour involved and person hours needed for various operations.

Pests and diseases and responses of cultivators to such problems.

Techniques for storing and reported storage life.

Additional information was gathered on the views of those who have sold wild yams before, regarding the marketability of the different varieties cultivated, and any beliefs associated with wild yams.

The above-mentioned expected products of the consultancy, numbered (1), (2), and (3); are kept separate as Parts I, II, and III of this report.

## PART I. AN INITIAL ENVIRONMENTAL EXAMINATION

This study of wild yams in the EMU of the Lolihor region of North Ambrym investigated cultivation and harvesting methods, pests and diseases, and the community's opinions regarding their production and use. The main purpose was to assess the possible effects of larger scale wild yam cultivation on the environment.

The proposed forested wild yams planting sites are mostly of mixed lowland forest with one or two storeys of trees. The yam vine utilises the forest for shade and support for its foliage.

Of the three wild yam species identified, the most widely cultivated is **Dioscorea nummularia** called remfir in Lolihor. Some 16 varieties are known to those interviewed. Of these, 3 are considered to have good to very good marketability value. One of these prefers cleared areas while two thrive under native bush.

The cultivation of wild yams as practised in Lolihor requires minimal clearing of undergrowth. No trees of the canopy storey or shrubs of the understorey of the bush are either removed or damaged in the process. Indeed any damage to these would be to the disadvantage of the germinating yam which requires both shade and moisture for survival. Planting in the loose volcanic sand that forms the substratum of the forest is done mostly by hand. A small hole is cleared in the earth. The yam seed, be it a tuber top or tuber seed, is placed in the hole and covered with the earth to a depth of from 4cm to 8cm. There is no apparent pattern to the planting of wild yams in the bush. They may be planted in isolation or in clusters of two or more under one tree. Deep rooted trees without buttresses and that produce much leaf litter are favoured for wild yam shade and support. Trees whose roots may be damaged at harvest are avoided. This is because the roots get in the way of the tubers.

Wild yams need no further care until they are harvested. They survive as other forest lianas do. Tubers are dug out by hand. The lack of use of tools, even of the digging stick, for both planting and harvesting of wild yams render these activities most benign to the environment. Minimal clearing is made of the leaf litter and herbal ground cover around the base of the vine. Each tuber is narrowly followed by digging along its length to its end.Harvested tubers are cut off just below the base of the vine. Small tubers are not harvested and replanted along with the vine to produce the next harvest. It is in the interest of the harvester to minimise disturbance ensuring a good next harvest.

Observations indicate that the cultivation of wild yams in the EMU is protective of the environment. The only possible threat is the choking of host trees under more intensive cultivation. This can easily be controlled through limiting plants under each tree. No further environmental assessment is required.

PART II. WILD YAMS IN VANUATU AND MELANESIA
An Annotated Bibliography

## Introduction

This bibliography was compiled from a day's work in the library of the University of the South Pacific (USP) in Suva. The USP library has a fairly good collection of literature on the Pacific, as well as a good range of publications on tropical crops.

Preliminary discussions with the PEP Liaison Officer indicated that the term wild yams in relation to the PEP project in North Ambrym is inclusive of all varieties of three species of the genus **Dioscorea** that are both cultivated and naturalised in the forests of Ambrym. The species concerned are: **D.nummularia, D.pentaphylla**, and **D.bulbifera**. The literature survey therefore concentrated on both general information about any of these species and specific information about them in Melanesia. The latter include cultivation and harvest practices, storage, pests and diseases, and any associated folklore. Melanesia was taken to include PNG, Solomon Is., Vanuatu, New Caledonia, and Fiji.

Unfortunately, much of the literature on yams in Melanesia focus on **D.alata**, the water yam, which is of extreme ritual importance throughout much of Melanesia and the rest of the Pacific. **D. alata** survives only in cultivation and is the most widely cultivated yam species in the Pacific.

Of the three wild yam species identified for this survey, **D.bulbifera** is the most widespread,with its natural range covering both the African and Asian continents. **D.pentaphylla** and **D.nummularia** are both natives of S E Asia and are cultivated throughout Indonesia and Oceania. It is not surprising therefore that more information was found on **D.bulbifera** than on the other two species. **D. pentaphylla** is claimed to be the most widely variable Asian yam, apart from **D.alata** (USDA) while **D.nummularia** is said to have its greatest centre of diversity in PNG and Indonesia (USDA).

Of the 1575 literature entries this author found on yams, only 2.7% deal in any way with one or more of the three species of interest. In terms of the countries of Melanesia, 7 entries deal with Fiji, 3 with New Caledonia, 15 with Papua New Guinea, 2 with Solomon Islands, and none with Vanuatu.

An additional 8 entries have been added to this bibliography from the literature survey conducted by M T Austin of the university of Hawaii. These are indicated with the letter "H" in brackets after the listing number.

This bibliography is arranged under 8 headings as follows:

- General information
- Evolutionary and human-aided distribution
- Economic potential
- Description of species and varieties
- Cultivation and harvesting
- Storage and transport
- Pests and diseases
- Rituals

## General Information

The following are general and reference works which contain some information on one or more of the three wild yam species of concern here. The USP Library also holds a bibliography compiled by the International Institute of Tropical Agriculture in Ibadan, Nigeria, in 1976. Although this is dated, it does give a useful range of what is available on these little-studied yam species.

1. COURSEY, D.G. 1976.
Yams. T P I , London, Longmans. 1976.

The most comprehensive treatment of yams available, this 230-page book covers all the economic yam species, including the edible ones. The discussion includes the history, geography, taxonomy, botany, agronomy, pests and diseases, production and utilisation, chemical composition and nutrition, storage and transport, processing, social and cultural importance, and the toxic and pharmacologically active constituents of the different yams, wherever these are known.

2. KAY, D.E. 1973
Root crops. London, Tropical Products Institute, xiii, 245p. (TPI Crops and Products Digest No. 2).

Summarises information on all aspects of selected root crops including (on pages 190-239) nine species of yams (Dioscorea) one of which is D.bulbifera.

3. LAWANI S. M. AND ODUBANJO, M. O. 1976
A Bibliography of yams and the genus Dioscorea.
IITA, Ibadan, Nigeria. March, 1976.

4.(H) MALCOLM, S. and J. BARRAU. 1954
YAMS. South Pacific Bulletin Vol. 4 (3): 28 - 31.

Discusses yams as important subsistence crops of the Pacific. Includes D.pentaphylla and D.bulbifera. Simple diagrams of leaves are provided for identification.

5.MARTIN F.W. 1974.
Tropical yams and their potential part II. **Dioscorea bulbifera.** Washington D.C., Dept. of Agric., Agric. Research Service. 20p. illus. (Agric Handbook No. 466).

This is one of a series of booklets on yams discussing their botany, culture, culinary values, and composition.

6. MESSIAEN, C.M. 1975.
Le potager tropical. 3 - cultures speciales. Paris, Presses Universitaires de France. pp. 429-454.

An illustrated description of some cultivated **Dioscorea** species with notes on their botany, agronomy, diseases and pests. Species include **D.bulbifera, D.nummularia** and **D.pentaphylla**.

7. NICHOLS, Sir Henry Alford and J.H.HOOLAND. 1929.
A Textbook of Tropical Agriculture. London, Macmillan and Co. pp. 441-447.

Describes yam varieties and yam growing including brief notes on **D.bulbifera**.

8. USDA, Agriculture Handbook Number 538.
Tropical yams and their potential. Part 6. Minor cultivated **Dioscorea** species.

**D.pentaphylla** and **D.nummularia** are amongst the five more important minor yam species discussed. **D.bulbifera** was considered a major species.The booklet includes a discussion of the botany, taxonomy, and composition of these minor yams.

9.(H) WAITT 1963
Yams, Dioscorea Species. A review article.
Field Crops Abstracts, Vol.16 No. 3. Aug.1963.

A general reference covering available information on the cultivated yams including their taxonomy, chemistry, agronomy and cultivation practices, harvesting and storage practices, pests and diseases. While most of the information is on **D.alata**, there is some mention of **D.bulbifera**.

## Evolutionary and Human-aided Distribution

10. BARRAU,J.1963.
Introduction of plants and the migrations of Pacific peoples. Honolulu, Bishop Mus. Press, pp1-6.

Includes a discussion of the distribution of **Dioscorea spp.** Almost all of them have been introduced into the Pacific by human agency.

11. BURKILL, I.H. 1960.
The Organography and the Evolution of Dioscoreaceae, the family of yams. Bot. J. Linn. Soc., 56(367): 319-412.

A technical discussion of the evolution of the family based on development of the different organs.

12. NOTER, R.de. 1913.
Yams (Dioscorea). Agr. Prat. Pays Chauds. 13(118): 1-18.

Gives data on the origin, history, principal species, 23 cultivated varieties, and methods of cultivation in Asia, Oceania, North and South America, Africa and Europe. The methods of cultivation discussed cover those of cultivated yams.

## Economic Potential

13. VERVLOET, C. 1952.
On the selling possibility of yam plants (Dioscoreaceae) that grow wild in Sumatra. Bergculture. 21: 181-183.

## Description of Species and Varieties.

14.(H) BARRAU, j. 1961
Subsistence Agriculture in Polynesia and Micronesia.
Bernice P. Bishop Museum Bull. 223.

Includes the family of yams, Dioscoreaceae, and provides the native names of different species of yams cultivated in Polynesia and Micronesia. These also cover **D.bulbifera, D.nummularia,** and **D.pentaphylla.**

15.BOURRET, D. 1971.
A Study of New Caledonian Yams. Pacific Scientific Congress Proceedings, 1: 135

16. BOURRET, D. 1975.
Key to species of Dioscoreaceae in New Caledonia. ORSTROM. SPC. Noumea.
Includes the description of 4 varieties of **D.bulbifera**, 7 varieties of **D. pentaphylla**, and of **D. nummularia**.

17. MIEGE,J.1982.
De quelques caracteres discriminatoires entre les taxons infraspecifiques de **Dioscorea bulbifera**. In Yams Ignames
Ed. J Miege and S N Lyonga.Clarendon Press. Oxford. p.185-196.

A study of the morphological variability of bulbils, leaf stalk, and leaf epidermis as well as variable chromosome numbers of **Dioscorea bulbifera**.

18.BURKILL, I. H. 1924
Varieties of **Dioscorea pentaphylla** in Malaysia. Gardeners' Bull., 3(7/8): 258-259.

19. BURKILL, I.H. 1951.
Dioscoreaceae. Flora Melanesiana ser., 1(43): 293-335.

Gives a taxonomic treatment of the species of **Dioscorea** in Melanesia.

20.(H) FOSBERG, F.R. and M. H. SACHET and R. OLIVER, 1987.
A geographical checklist of the Micronesian Monocotyledonae. Micronesia 20 (1-2) 19-132.

Includes brief descriptions for ease of identification of the species **D.nummularia** and **D.pentaphylla**.

21. KARNICK, C.R. 1973.
The biology, pharmacognosy and ethnobotany of **Dioscorea bulbifera** Lin. and some of its varieties in India. Paper submitted for the 3rd. Int. Symp. on Trop. Root Crops,Ibadan, Dec. 2-9. (Abstracts of Submitted Papers No PB-33)

22. PARDEE,W.H. 1971.
Local identification of non-cultivated **Dioscorea bulbifera** L. on Bellona Island, (British Solomon Islands Protectorate). J.Agr. Trop. Bot. Appl., 18(1/3): 36-49.

23.(H) PARHAM, W. L. and DAKUI,M. 1938.
The Yam. Fiji Agr. J. Vol.9(3): 12.

Briefly mentions **D.pentaphylla** as being very similar to potato in the young stage.

24.(H) PILO, N.L. and A.G.DINGAL. 1987.
Maintenance, characterisation and preliminary evaluation of yams (Dioscorea spp.) in the Philippines
IBPBR, Regional Comm. for S.E.Asia Newsletter, June 1987. FAO. Bangkok, Thailand 10200.

A very brief account of the preliminary evaluation of some yam species collected for the yam germplasm at the Philippines Root Crops and Training Centre. Mentions **D.bulbifera** and **D.pentaphylla**.

25. WILSON, J.E.
A Practical Guide to Identifying Yams
Agro-Facts An IRETA Publication 1/88

A simple illustrated guide to the field identification of some cultivated yams in the Pacific. Includes **D.nummularia**, **D.bulbifera** and **D.pentaphylla**.

## Cultivation and Harvesting

26.(H) BARRAU, J. 1959
Subsistence agriculture in Melanesia. Bernice P. Bishop Museum Bull. 219.

Lists 6 species of yams eaten by Melanesians. These include **D.bulbifera**, **D.nummularia**, and **D.pentaphylla**. Some techniques of cultivation are described, but these are of the cultivated yam, D.alata.

27. OKONKWO, S. N. C. et al. 1974.
Effect of age on the development of node cuttings of **Dioscorea bulbifera** L. Paper presented at the Third International Symposium on Tropical Root Crops at IITA Ibadan, Nigeria on 2-9 Dec., 1974.

28. WILSON, J. E. 1982.
Recent developments in the propagation of yam (Dioscorea]spp). Vegetative propagation for rapid multiplication. In Yams Ignames, Ed. J.Miege and S.N.Lyonga, Clarendon Press, Oxford. p 55-59.

Describes experience with large scale multiplication using; rooted vine cuttings, scarified tubers, and densely planted small setts.

## Storage and Transport

29. WILSON, J.
Careful Storage of Yams. Com. Sec. IITA, Ibadan, Nigeria.

Illustrated booklet giving useful instructions on the storage of yams and the various structures that may be constructed for such. Conditions necessary for before and during storage are also discussed.

## Pests and Diseases

30.BRIDGE, J. 1982
Nematodes of Yams. In Yams Ignames. Ed. J Miege and S N Lyonga. Clarendon Press, Oxford. p. 253-264.

Discusses nematode infestation of yams in general and of D.alata in particular.

31. WINCH, J.E. and NEWHOOK, F.J. 1984.
Studies of **Colletotrichum gloeosporioides** disease on yam, **Dioscorea alata**, in Solomon Islands. Plant Pathology (1984) 33, 467-477.

Tests on susceptibility to anthracnose or dieback were made on some yam species. **D.bulbifera, D.nummularia**, and **D.pentaphylla** were all found susceptible. The disease is however not serious in the Pacific.

Rituals

32.TURNER, J.W.1984.
True Food and the first fruits: Rituals of increase in Fiji. Ethnology V.23 pt. 2, 1984.

Describes the "I sevu" the presentation of the first harvest of yams to the ancestral spirits in a community at the interior of Fiji. Before the cultivated yams, symbolic of maleness, are presented; women harvest wild yam bulbils from the forest and present them to the men. The women cook the bulbils for a special meal for the men. Wild yams symbolise femaleness. The seasonal yam crop symbolises the ebb and flow of life and the renewal of fertility each year.

**Conclusion**

This brief bibliography reveals the paucity of information recorded on the edible wild yam species let alone the cultivation practices of those communities in Melanesia that do plant them.From the author's experience in Fiji and in Vanuatu, wild yams do not have the same ritual value as the cultivated yam, Dioscorea alata. Their cultivation on any appreciable scale has never been considered either officially or unofficially in Melanesia. However a large number of Melanesians continue to cultivate, either in the bush or close to their homes, a few varieties of choice for various reasons.

## PART III A REPORT ON WILD YAM CULTIVATION IN LOLIHOR (EMU)

### 1. Wild Yams: Species, Varieties and Some Evaluation.

The people of Lolihor EMU, identify at least 28 kinds of wild yams belonging to three different species of the genus **Dioscorea**. In addition, the species **Puereria lobata** is included along with wild yams as another root crop that may be harvested from the bush in times of disaster. Puereria could be called a yam bean rather than a yam as it is closely related to the other tuberous legume,**Pachyrhizus tuberosus**, commonly known as yam bean.

The term "wild yam" needs to be clearly defined for the PEP project as its interpretation in English, in Bislama, and in the language of the Lolihor area do not coincide. The meaning in each of the three different languages is as follows:

English:
The term yam is sometimes used for a variety of root crops including sweet potatoes (**Ipomoea batatas**), some tuberous legumes properly called yam beans, and species of the genus **Dioscorea**. In the Pacific, the term yam is correctly applied to the members of the genus **Dioscorea**. Wild yam would therefore encompass any member of the genus **Dioscorea** that survives without cultivation and untended in both undisturbed and disturbed wild areas, including native forests. Most authorities agree that yams (**Dioscorea** spp.) have been introduced to the small Pacific island countries, including Vanuatu, by human migrants.Thus yams found growing in the wild would be cultivars that have become naturalised.Some cultivars of the species **D.alata, D.bulbifera, D. esculenta, D.nummularia, D.pentaphylla** and possibly **D.trifida** have indeed become naturalised in parts of Melanesia. In Lolihor yams found growing in the bush were varieties of **D.nummularia, D.bulbifera** and **D.pentaphylla**.

Bislama:
In Bislama the term wild yam is restricted to the varieties of the species **D.nummularia**, some of which cannot survive in the wild without deliberate cultivation and management by humans.

Lolihor:
In the language of Lolihor the Bislama term "wild yam" is translated as "remfir". The term remfir does not in any way denote "wild" - the ability to survive in the bush without cultivation.In Lolihor language the term "rem" means "yam". The term "fir" means to dig out long hair with fingers in the motion similar to that of a mother hen digging for worms in a pile of debris. This is descriptive of the way tubers or rhizomes of the hairy yam **D.nummularia** are dug out by hand during harvest. The

substratum that supports the lush vegetation of Lolihor is a rich and loose volcanic sand that can be easily dug by hand. The term remfir is the generic name for all the varieties of **D.nummularia** that people of Lolihor recognise. Some cannot survive without deliberate planting in the bush or wild areas.

This report:
In this report the term wild yam includes all varieties of the species **D.bulbifera, D.nummularia**, and **D.pentaphylla**, that are either cultivated or have become naturalised in wild areas and native bush of the EMU area of Lolihor. No cultivars of D.alata or **D.esculenta** were found to grow outside of proper garden plots. Wild yams are vines that reach up to the tree or forest canopy for light.

Other wild yams of Ambrym.
As a matter of interest the author notes that East and South East Ambrym are reputed to contain many more varieties of wild yams than North Ambrym. It appears that the people of those other parts of Ambrym have a greater tradition of growing wild yams. It is possible that varieties of D.trifida also exist in East and South East Ambrym in addition to those species found in North Ambrym.

Varieties of wild yams in Lolihor:
The people of Lolihor distinguish at least 16 varieties of **D.nummularia** which they call remfir; at least 11 different varieties of **D.bulbifera** which they call waiu; and recognise **D.pentaphylla**, known as malmil, of which no separate varieties were described.

Remfir.
The 16 varieties of remfir described vary from long storage rhizomes that may grow up to 3 meters in length, through morphological variations of the oblong form to globose tubers that may be reach the size of a large pumpkin. There are usually two or more rhizomes or tubers to a single plant. Under favourable growth conditions some varieties may produce tubers as numerous as 20 under one vine. The diameters of the tubers vary from a thin rhizome the size of a man's finger across, to some 60cm across for the very large and long varieties. The colour of the raw flesh varies through different shades of white to brown with one variety a clear purple. The cultivators differentiate the varieties by their tubers' shape, size, hairiness, flesh colour and taste; as well as the appearance of the lower stem close to the ground. The latter part is known as " stamba" in bislama. Because the rest of the plant particularly the leaves, are usually lost in the canopy of the bush, people of Lolihor have not used differences in leaf shape, arrangement, or appearance to identify the various varieties. Some differences in leaf appearance were noted in the field.

Table 1 summarises the main taxonomic features of the different varieties of remfir found or described to the author in Lolihor. Plate I shows the sketches of leafy branches of those varieties of remfir that the author found growing in the bush. Plate II illustrates some of the tuber variability displayed by the varieties of remfir.

Waiu.

Waiu is the generic name for the species **D.bulbifera**.This species as the latin name implies, regularly produces aerial tubers or bulbils at the axil of leaves. Some forms of **D.bulbifera** are toxic. These are known as Waiukon or Uikon. They were eaten in the olden days only in times of want and had to be specially processed to get rid of the water-soluble toxin.Plate III shows the growth form of the toxic waiukon that thrives both in the bush and in cleared areas of Lolihor. The non-toxic forms are known as Waiuten or Uiten. The people of Lolihor recognise eleven different varieties of waiuten. Two of these are usually cultivated in ordinary gardens while the remaining nine are cultivated in the wild.The varieties of waiuten do not appear to be as popularly cultivated as the varieties of remfir. The two varieties that are grown in ordinary gardens will also survive in the wild, and are grown for their tubers. Their bulbils make good seed material. Four of the other varieties are usually grown for their underground tubers which are not as large nor as variable as those of remfir. The bulbils of the other five varieties may be gathered for food. Two are reputed to be particularly good eating. The bulbils of all varieties are used for seed. The varieties of waiuten are differentiated by the shape, size, colour and taste of their tubers and/or bulbils. Table 2 summarises the main taxonomic features and some assessments on yields of the varieties of waiuten.

Malmil.

Malmil is the generic name for the species **D.pentaphylla**. It does not appear to be as widely cultivated as either **D.nummularia** or **D.bulbifera**. Malmil could have been a very recent introduction as the people of Lolihor do not recognise any different varieties of this species despite the fact that in nearby New Caledonia 7 varieties of D.pentaphylla are cultivated compared to 7 of D.nummularia and 4 of D.bulbifera.Another possible reason could be that it is not favoured as a food item because it is considered "too watery" for the Lolihor palate. When boiled it is very similar to a light potato. A summary of the main features of Malmil is at the bottom of Table 2.

Some Evaluation of Wild Yams.

During the interviews, people's opinions were sought on the ease of cultivation, the yield, the marketability, the resistance to pests, the taste, and the range of suitable cooking methods of the different varieties of wild yams. It was obvious from these interviews that the most widely consumed wild yams were the varieties of remfir. Those of waiuten and malmil were less regularly consumed. Thus no opinions were collected on the palatability and cooking methods of these two latter species. These evaluation comments are recorded in Tables 3 and shall be discussed under the section on transport, storage and marketability.

## 2. Cultivation and Harvesting Practices

Wild yams are usually cultivated in the native bush with very little disturbance of either the undergrowth or the substratum. Where there is little or no ground cover vegetation, the leaf litter is simply cleared from a small area at the spot selected for planting. Where there is some ground cover such as small ferns or low herbs these may be cleared around an area no more than 10cm to 20cm radius for planting the seed yam.The planting material may be the top of the underground tuber, a small seed tuber, or the bulbil - in the case of varieties of waiuten.

The loose earth is dug with the fingers to make a small hole of a few inches deep and the planting material buried in it to a depth of no more than four inches below the surface.This is to allow the young shoot to break out easily and to quickly wend its way up to the top of the canopy for fuller exposure to the light. Once the wild yam plant is established its tuber top can be replanted after every harvest at the same spot. Its subsequent survival and yield is very sensitive to the way it is harvested and replanted. Unless new areas are being planted the cultivation of wild yams usually accompanies their harvest.

In the current cultivation practices, wild yams are planted in no set pattern or regular plots. The cultivator may plant one or more in any spot in the bush that she/he considers favourable. Criteria for selection of planting spots usually include shade, nature of undergrowth and leaf litter, aspect of the land, ease of digging the earth, and tree species under which the yam is to be grown. The author found wild yams that were planted singly with no other wild yam plant for quite a few hundred meters around to those that were planted in clusters of up to 20 under the wide canopy of two or three closely growing trees, to a plot of roughly 9m x 8m with plants spaced about 1m apart.

PLATE I Sketches of Leafy Branches of Some Remfir Varieties

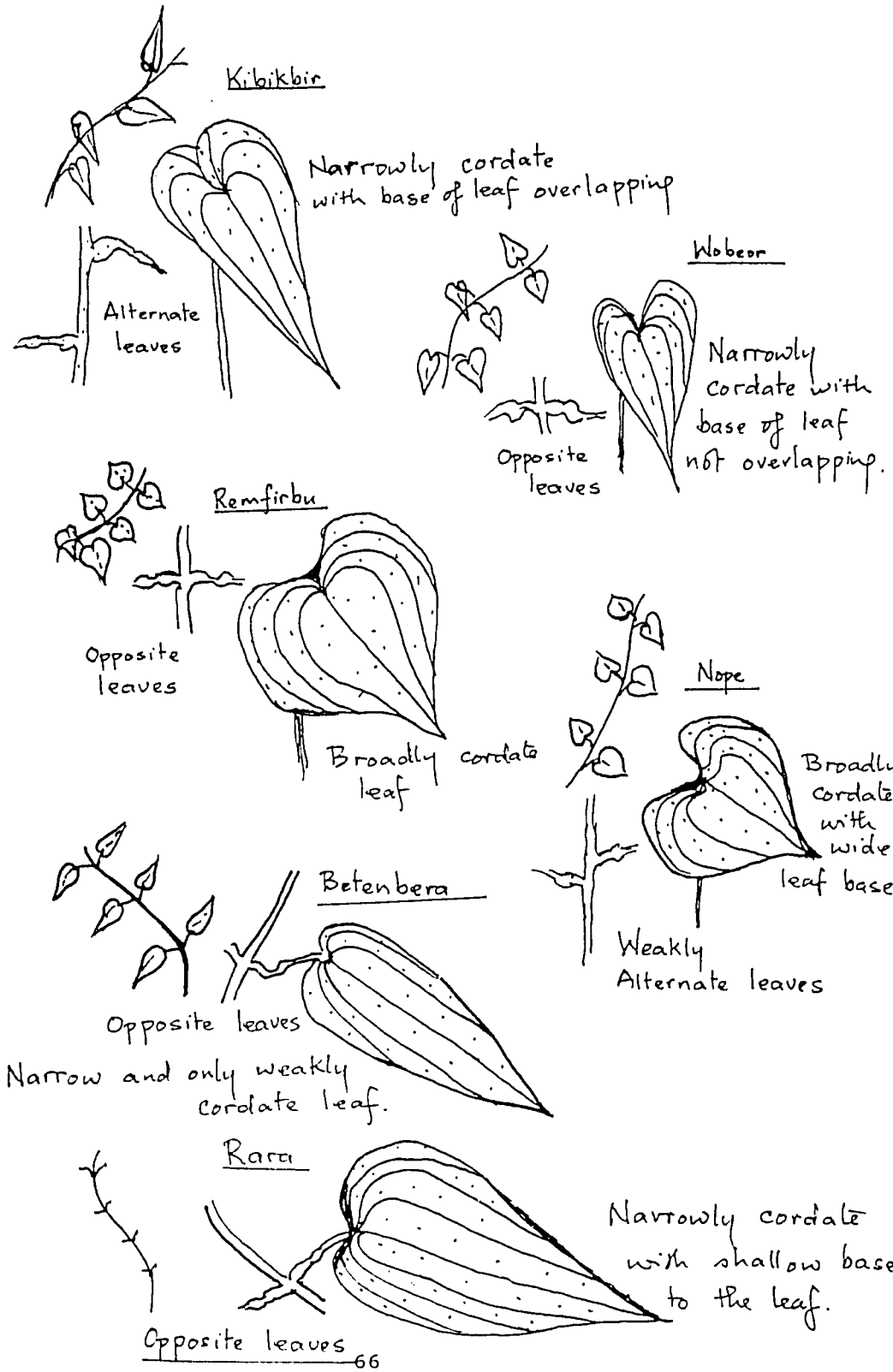
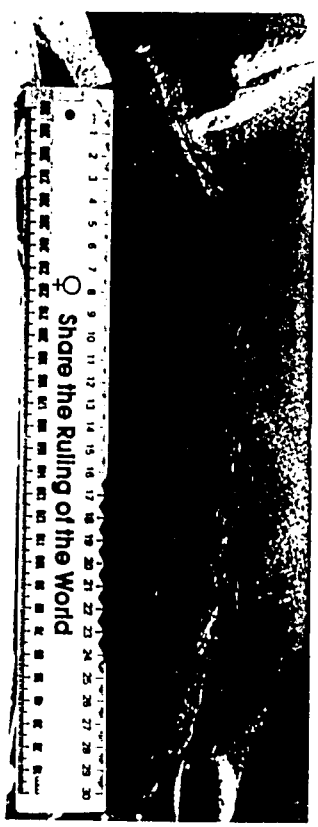


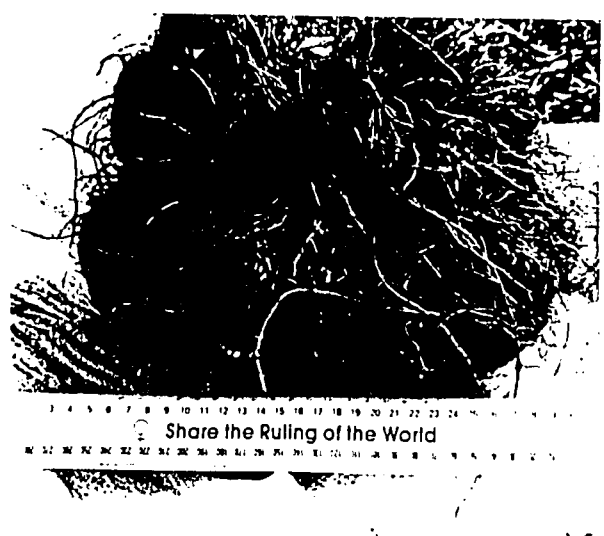
PLATE II Tuber Variability Displayed by Some Varieties of Remfir

Betenbera

Papaliya




Remfirbu




Lohonbu

PLATE III Waiukon and Malmil

Waiukon growth form: note small hairy tuber, smooth bulbils,and cordate leaf with palmate veins

Malmil: Note cluster of globose underground tubers and the palmate leaflets.

Tree species preferred by cultivators for planting wild yams under include; linum and liwama (both **Ficus** spp.), burao or libolwa (**Hibiscus tiliaceus**), liglara or nagalat (**Dendronide** spp.), navenu or liunu (**Macaranga** spp.), nadawa or lira (**Pometia pinnata**), and liburu. Trees that are considered unsuitable include nabaqa (**Ficus** spp.), live tree fern (**Cyathea** spp.) liol or coconut, liliu or namabe (**Inocarpus fagiferus**), and lirara (**Myristica fatua**).The main feature for non-suitability of tree species seems to be the presence of thick roots that make digging of tubers difficult.

After the yam seeds are planted, they are left to germinate and may not be visited again until harvest time.No care is required during growth. The author visited a patch of wild yam plants that had not been revisited since first planting over 16 months ago. Seed materials for these included both tuber tops and seed tubers. Growth of plants from tuber tops was about twice as fast as that from seed tubers. Plate IV shows the different growths of some of these new yam plants.They become natural components of the forest. Their cultivation is currently environmentally benign. More intensive planting could choke out host trees if not well managed. (See Plate IX).

A yam plant is ready for harvest when the stem dies back and the leaves all turn yellow to die. The leaf litter and ground cover if any, are cleared from an area of about 10cm to 30cm radius around the base of the yam plant and the earth is dug away by hand to reveal the yam tuber underground. The earth is carefully piled to one side while the digging closely follows the path of growth of the tubers to their respective ends. Each tuber is then carefully cut off from the base of the aerial stem and gently lifted out of the ground to avoid any scratches to its skin. Any tubers considered too small to harvest are left on the plant. After the removal of all the harvestable tubers, the tuber top attached to the base of the aerial stem and any other small tuber left unharvested are carefully buried back in the same hole. The whole thing is usually buried in soil rather than with leaf litter. Plate V shows the harvest of some wild yams in Lolihor, and the loose sandy nature of the earth in which they grow.

One of the cultivators interviewed fills the hole with leaf litter before replacing the yam top and then covering it with soil. Other cultivators claim this is not good for the new growth as the dead leaves usually introduce insects and other pests. In addition, the decomposition of the leaf litter produces too much heat for the young roots of the new yam growth.

This replanting of the top of the harvested yam is critical not only for the next harvest but also for the continual survival of the wild yam plant. The author was shown many areas where wild yams were claimed to have once thrived in plenty, but where none now exists. The reason given for the disappearance was lack of care during harvesting.

## 3. Land Ownership and Site Selection

All the cultivators interviewed plant wild yams only in their family land. During a group interview with the women, it was stressed to the author that one of the anticipated constraints to commercial production of wild yams by some members of Lolihor community, will be the availability of land. One family interviewed had divided their family land up for individual ownership amongst the male members. Land inheritance is patrilineal in Ambrym. Any family member may plant yams in bush on family land, but the right to harvest that yam may be exercised by any other member of the family. Where the land has been divided up for individual ownership, the exclusive right of the owner to plant and harvest is better recognised. Because the other family members have often used their right to harvest wild yams planted on family land, and because in doing so they have often not been so careful at replanting the yam tops, many wild yam plants have failed to survive. This has also dampened the enthusiasm of some wild yam planters. Some have resorted to growing their wild yams in the furthest bushlands to avoid harvest by other family members or poaching by other villagers.

The selection of the actual site for the yam cultivation in one's bush area is a matter of individual taste. Different cultivators have their own special requirements such as the choice of tree species, the degree of slope of the land, the thickness of leaf litter, the groundcover in the area, the amount of shade, and the texture of the earth. Plates VI and VII show some bush features considered suitable for wild yam cultivation.

## 4. Labour

Wild yam cultivation is not restricted to a special group but may be practised by any member of the community. Those the author interviewed included men women and youth. See Plate VIII.

The time spent on the actual tasks of planting and harvesting wild yams is minimal. Much of the time taken in wild yam cultivation and harvesting in Lolihor is spent walking over the steep terrain to and from the yam plants. Most of the yam planters interviewed spend about an hour walking to the wild yam area, about half an hour harvesting and replanting, and another hour walking back home. At the end of this two and a half hours, the product is usually a single basket of wild yams.

**Cycle of labour**

When planting for the first time, wild yams may be planted at any time of the year. However once the plants are established planting consists of re-burying the tops immediately after harvest of the tubers. Harvests are from June to December.

PLATE IV Young Wild Yams from First Planting

Remfirbu -

About 15 months old

in bush from tuber seed

Remfirbu -

Less than a year old in village compound

Kibikbir

- Less than a year old in village compound

Remfirbu -

- About 17 months old

in bush from tuber top

PLATE V Harvesting Wild Yams

Digging out malmil tubers

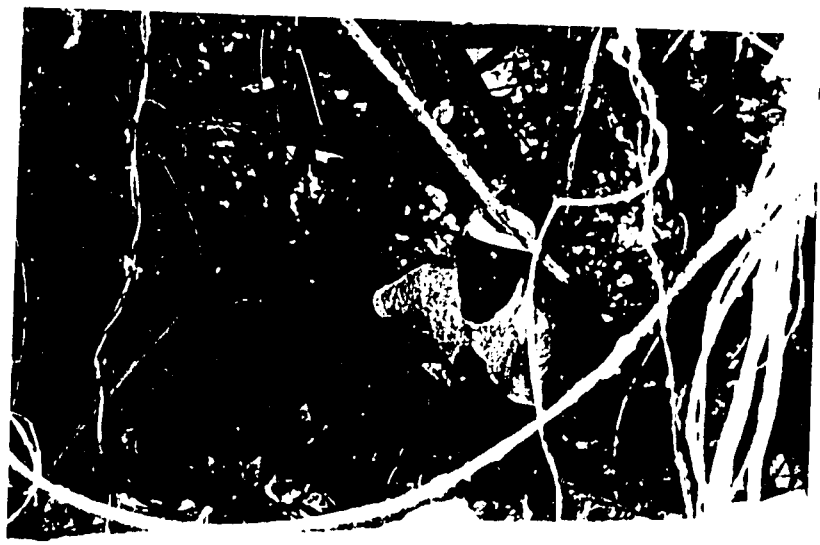
Remfirbu ready for harvest

Slope showing nature of loose sandy earth.

Remfirbu vine base remains while tubers are removed
Note remains of tuber tops which are reburied with vine base.

PLATE VI Good Wild Yam Areas

Light forest - one tree storey and herbal groundcover.



Light forest of trees, shrubs and sparse underground herbal cover.

PLATE VII Good Wild Yam Areas

Burao bush on

well-drained slope

Only dead tree ferns are good for wild yams. This slope cover of tree fern and Parasponia is evidence of recent severe land slide in the area.

PLATE VIII Groups Interviewed

Men's group

Youth interviewed

Some of the women interviewed

While it is claimed that wild yams may be harvested every year it seems evident from the field observations that with most varieties, a given plant may be harvested only every two years at least. The period from first planting to first harvest vary with varieties and with planting material. This may take up to four years. The variety kibikbir is claimed by one wild yam planter to be the fastest growing and to take only one year or even nine months to first harvest. After the first harvest, subsequent harvests for all varieties are then every one or two or more years. Plate IX shows wild yams of various ages.

## 5. Pests and Diseases.

The greatest threats to wild yams in Lolihor are claimed to be human poachers, wild pigs, wild cattle, and foraging megapodes. The cultivators have not developed any defences against any of these threats and seem to accept the inevitable high loss of crop due to these agents.

Other pests described to the author include termite epidemic, and insects that burrow into the tubers during storage. Diseases include nematode infestation, fungal attack of leaves and tubers, and bacterial infection of the tubers. See Plate X. None of these pests and diseases has been serious enough to wipe out a large proportion of the crop in any given year. Volcanic ash and acid rain are additional threats that the cultivators have learned to live with. All the wild yam varieties found in Lolihor although adversely affected by volcanic showers do survive them.

Pests and diseases of concern to the cultivators are those that attack the tubers after harvest and therefore affect their durability in storage and their marketability. These include insect attack, as well as fungal and bacterial infestation that spoil the flesh and kill the growing layer of the tuber under the skin. It appears that the bulbils of waiuten, because of their tougher skins, are more resistant to damage and therefore to pests and diseases. Varieties of remfir that are easily damaged either at harvest or during transport are of course more susceptible to diseases on storage.This is particularly true of the high yielding and popularly grown kibikbir, claimed to be good eating as well. At harvest the long tubers of kibikbir have to be broken up for ease of transport. This allows easy access of fungal and bacterial infection.

## 6.Storage, Transport and Marketing

When undamaged, wild yams may be stored underground or wrapped up in laplap leaf (**Heliconia** sp.) for several months. See Plate XI. Some interviewees claim wild yams buried underground after harvest will keep for up to six months. Others report that damaged skin of wild yams may be covered with breadfruit sap. Such treatment will increase storage time.

Transport of wild yams both from the bush to the village and from the village to the market must ensure minimal damage to the skin of the tuber. Any break in the skin provides a ready entry for fungal and bacterial spores as well as insect burrowers.

Interviewees who have sold yams before indicate there is a small market within the island of Ambrym and a much larger market in Port Vila. In the years 1990 and 1991 a market centre was available in Ranon village.Wild yam planters were able to sell wild yams here for VT300 to VT400 a basket. Wild yams have also been sold at West Ambrym for VT500 a basket. Varieties with low storage value such as kibikbir could be sold locally. Table 2 summarises the opinions expressed by cultivators about the marketability of the different varieties of remfir. This shows that three varieties are considered to have good to very good marketability, as judged by their storage property, their popularity with buyers, and the ease of transporting them. The three varieties are remfirbu, nope, and lohonbu. The author found tubers of remfirbu and lohonbu in Vila market. See Plate II. Two tubers of the former were selling for VT.600 while one tuber of the latter sold for VT.500. It would appear that a good market does exist for varieties of remfir in Port Vila. In addition the author also found several baskets of bulbils of waiuten in Vila market selling for VT.500 a basket. Just how large the market is and whether there is potential for catching a wider clientele is yet to be investigated. There may be a possibility of selling the potato-like malmil and some varieties of waiuten to the hotels and restaurants of Port Vila and Luganville for the tourist and expatriate market.

## 7.Customary Beliefs

Customary beliefs reported to the author are associated only with the consumption of certain varieties. No special beliefs or rituals were reported for the cultivation or harvest of wild yams. The varieties remba, ubel, and wobeor, are taboo for those with injuries or sores as these may worsen with consumption of the wild yams concerned. The variety uremeul is taboo for children. It is believed that children will develop scabies-like sores on consumption of uremeul.

PLATE IX Different Varieties of Remfir at Different Ages

Nope:

About a year after harvest

and replanting

Remfirbu:

Well over two years in the bu

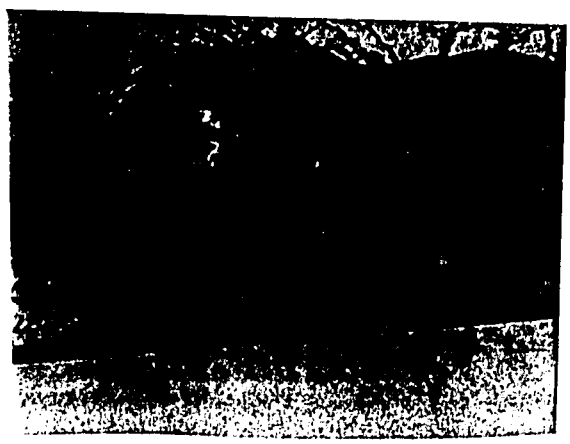
Betenbera:

About two years after

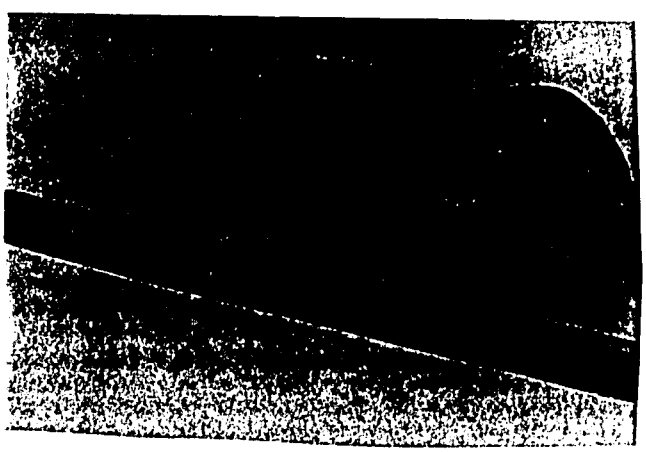
planting in village area

PLATE X Some Diseases of Wild Yams

Malmil with fungal and bacterial infection on cut surface.

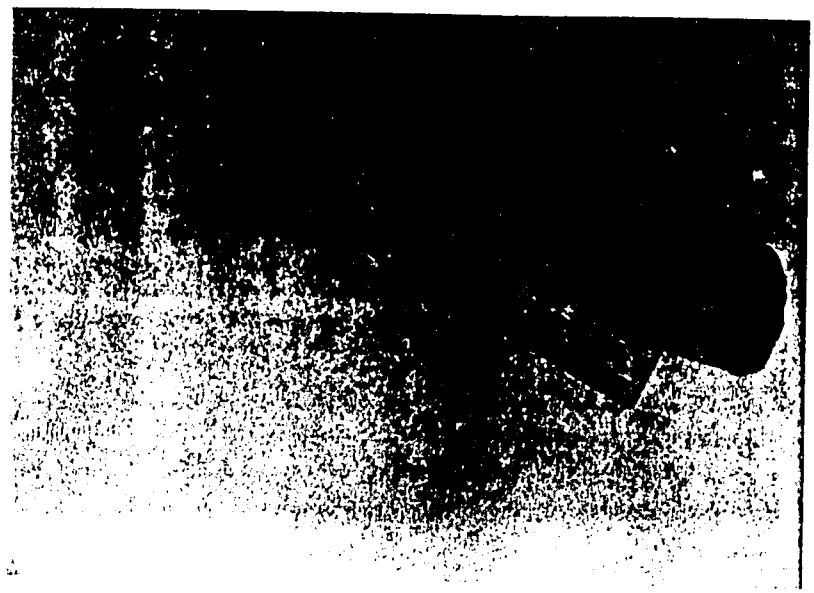


Damaged betenbera showing browning of flesh through fungal and bacterial infestation



Waiuten bulbil showing hole left by insect pest.

PLATE XI Tuber Storage



Tuber of remfirbu wrapped in laplap leaf for storage and for transport

## 8.Discussion

Given the steep terrain and the very loose nature of the earth that covers the Lolihor area, it is clear that extensive clearing of the lowland mixed forest cover will result in rapid erosion both by rain and by wind. The forest shows evidence of severe land slides in the past. (See PlateVII).Almost all of the area that is of gentler gradient has been cultivated either with coconuts or with subsistence crops and kava. If the current population is to extract more from the land to satisfy both subsistence food needs and cash requirements, they must adopt a strategy that will enable more intensive use of land currently cultivated and some economic use of the native forest that ensures its integrity is maintained.One of the ways in which this strategy could be implemented is through the promotion of the cultivation of wild yams as a commercial crop utilising existing coconut plantations, garden areas, and native forests.

Different varieties of remfir cultivated in Lolihor have slightly different environment requirements. This may be investigated further and choices made for marketable varieties to be cultivated on a larger scale than currently practised. Differences in environmental requirements of the selected varieties may be exploited in order to optimise the use of the land without undue destruction of the existing vegetation.

For example, of the three varieties considered to have good marketability, nope grows better under more light and is reported not to have survived under native bush. It is therefore a possible candidate for cutivation under coconut plantation enabling more productive use of coconut land.It may also be grown along the border of cultivated gardens. (See Plate XII). This possibility makes more sense now as the introduction of the cash crop kava has interfered with the usual rotation cycle of subsistence gardening based on cultivated yams. While the traditional cycle required two years cultivation of a garden site before it is left to fallow, kava holds up the same garden site for three to five years. This has resulted in shorter fallow periods for old garden sites.

The varieties remfirbu and lohonbu are reported to grow better under the heavier shade of native bush. Lohonbu has to be harvested every year or the tuber rots and jeopardises the continual survival of the plant. Remfirbu on the other hand can be left without harvest for two or more years to enable better growth of the tubers. This would suggest that some combination planting of these two varieties may be necessary in order to ensure annual harvests are maximised from a single plot.

Should a market be found for the varieties of waiuten (**D.bulbifera**) and for malmil (**D.pentaphylla**), cultivation of these yams may be carried out both under heavy bush and under the lighter shade of coconuts.

Cultivators claim that up to 10 plants of wild yams may be planted under a single tree with a single main bole, such as the nadawa tree. This number will of course be much less for the long tuber producers to allow space for tuber growth as these normally spread somewhat horizontally under the earth surface, radiating away from the base of the vine. On the other hand, the burao tree whose sometimes supine branches provide extensive shade and trap debris on steep slopes, may be able to support up to 20 wild yam plants. The burao tree was mentioned often as a favoured tree for growing wild yams. Burao may be easily established amongst coconut trees and as live fences to support wild yam plants. Such a scheme should be considered as part of the promotion of wild yam cultivation in Lolihor. As coconuts are planted much closer to the settlements, this will reduce considerably the time taken to walk to the wild yam patch and also enable more intensive use of coconut areas.

The conditions for growth, as well as the potential for large scale cultivation of wild yams without too much damage to the natural vegetation cover, are both favourable in Lolihor. However no attempts at such can be successful without the willing input of labour from a convinced populance. Many of those interviewed expressed interest in producing wild yams as a commercial crop. However initial enthusiasm in such a new venture can easily be extinguished when expectations are not fulfilled early enough. If the cultivation of wild yams on a larger scale than currently practised is to be encouraged in Lolihor, it is suggested that the following be carefully considered:

1. Some training in good planting and harvesting practices including good environment management.

2. Encouragement of two or three cultivators to demonstrate new ways of cultivation of wild yams in existing coconut plantations and around subsistence garden plots.

3. Provision of sufficient planting material of those varieties selected for better marketability.

4. Protection of the rights of the planters to harvest their own crops.

5. Some control or prevention of damage by wild pigs and cattle.

6. Organisation of a purchasing centre or agent in Lolihor.

7. Competetive purchase price offered to cultivators vis a vis kava and copra.

Should the cultivation of wild yams as a commercial crop under the different vegetation types of Lolihor prove successful, it could provide a valuable demonstration of profitable environment protection for other communities in high islands of Melanesia.

PLATE XII A Cultivated Garden

Garden wall made from burao branches and live burao posts may provide favourable conditions for growing wild yams closer to the village.

Inside the garden there is too much light for wild yams.

TABLE 1 TAXONOMIC FEATURES OF REMFIR VARIETIES BASED ON TUBERS

| Name | T.size | T/plant | T.colour | T.form | Other Notes |
|---|---|---|---|---|---|
| 1.metayalhoro | 3mx2cm | 7 | white | rhizom. | long,thin |
| 2.remfiranwunu | 1.2mx4cm | 20 | white | rhizom. | curved,thin |
| 3.kibikbir | main 2mx10cm branch 0.5m | 20 | white | rhizom. | branched |
| 4.larlar | 2mx10cm | 20 | white | tuber | |
| 5.remkon | 3mx15cm | 7 | white | tuber | few hair |
| 6.nope | 1.5mx15cm | 7 | brown | tuber | less thorny |
| 7.betenbera | 50cmx10cm | na | white | tuber | vine base end like bat head |
| 8.remfirbu | 90cmx10cm | 20 | brown | tuber | dense hairs |
| 9.ubel | na | na | white | tuber | small hairs |
| 10.rara | 60cmx6cm | 15 | white | rhizom. | branched |
| 11.uremeul | 2m long | 16 | white | tuber | forked |
| 12.wobeor | 5cm diam. | na | brown | tuber | long hairs at end of 2m string |
| 13.remba | 30cm diam. | na | white | tuber | dense hairs |
| 14.wala | 60cmx10cm | na | purple | tuber | thin skin |
| 15.lohonbu | 40cm diam. | na | brown | tuber | hairy |
| 16.papaliya | 3m long | 1 | white | tuber | grows down |

Notes: 1. Quantities given are what interviewees claim the tubers and rhizomes may grow up to.

2. T = tuber T/plant = tubers per plant

3. rhizom = rhizomatous underground tuber

TABLE 2. TAXONOMIC FEATURES AND YIELDS OF WAIUTEN VARIETIES AND OF MALMIL

| Name | T.shape | T.size | B.shape | B.colour | B.yield | Notes |
|---|---|---|---|---|---|---|
| 1.bumaso | | 60cm long | | | | tuber eaten |
| 2.remanviu | | several 60cm long | | | | tuber eaten |
| 3.tibaba | | 25cm diam. | | 1.yellow | 1bsk. | |
| 4.waiufil | | 10cm diam. | | 1.yellow | 1bsk | |
| 5.waiutaorkon | | 10cm diam. | | yellow | 1bsk | |
| 6.anovaghai | | 20cm diam. | | dark | 1bsk | |
| 7.waiutatana | | 10cm long | | purple reddish | 0.5bsk | good eating |
| 8.wargor | | 10cm long | | 1.yellow | 1bsk | good eating |
| 9.waiuantalonwil | | 10cm long | | purple spots | | tuber eaten |
| 10.longkonataba | | 25cm diam. | | purple | | tuber eaten |
| 11.tamagham | | 10cm long | | 1.yellow | | tuber eaten |
| D.pentaphylla | | | | | | |
| malmil | | very large | 0 | white tuber | | tiny bulbils |

Notes: 1. Sizes given are what interviewees say the tubers may reach.
2. 1.yellow = light yellow
3. Where tubers only are eaten, the bulbils are used for seed. In the variety remanviu, the vine may be trained so that the bulbils touch the ground and produce tubers in addition to that from the base of the vine.
4. The varieties bumaso and remanviu are grown both in the garden and in the bush.

TABLE 3. SOCIO-ECONOMIC INFORMATION ON REMFIR VARIETIES

| Name | Cooking | Taste | Yield | Cultv | Market | Notes |
|---|---|---|---|---|---|---|
| 1.metayalhoro | R | 10 | 2B | V.E | X | fibrous |
| 2.remfiranwunu | L R | 8= | 2B | V.E | X | soft flesh |
| 3.kibikbir | L* | 5 | 4B | fast growth | local only | damaged easily |
| 4.larlar | L* | 8= | | V.E | X | |
| 5.remkon | L* | 4 | <1B | Care | P | hard flesh |
| 6.nope | L Bo Ba* | 6 | 2B | >light | G | care with harvest |
| 7.betenbera | R* Bo L | 7 | | Care | F | |
| 8.remfirbu | R Bo L | 1= | <1B | Care | VG | most popular |
| 9.ubel | R Bo* | 3 | | Care | F | rots easily taboo |
| 10.rara | L R Bo | 1= | 1B | Care | F | |
| 11.uremeul | L Bo | | 2B | Care | F | taboo for children |
| 12.wobeor | L R Bo | | 0.25B | Care | X | taboo |
| 13.remba | L* R* | | | | very hard flesh F | taboo eat hot |
| 14.wala | L R | | | Care | | |
| 15.lohonbu | R Bo | | <1B | Care | G | must harvest annually |
| 16.papaliya | L Bo | | single long tuber | Care | F | |

Notes:
1. L=laplap, R=roast, Bo=boil, Ba=baked
2. Taste grading: 1 is best and 10 is worst.
3. B =basket
4. Care = care is needed in harvesting to ensure survival of the vine. Cultv.= ease of cultivation
5. P=poor, F=fair, G=good, VG=very good, X=not marketable

ANNEX I.

WILD YAM CULTIVATION INVESTIGATION
Data Sheet for individual cultivators

Cultivator: Village: Age:
Varieties currently cultivated and ranking:

| Variety | Taste | Yield | Ease | Market | Hardy | Range | Other Comments |
|---|---|---|---|---|---|---|---|

Sales in last five years: Price/basket:
varieties sold

Growing cycle:

| Variety | Seed | Plant | Harvest | Cultivation |
|---|---|---|---|---|

| Variety | Trees? | Niche? | Storage |
|---|---|---|---|

Hours of work involved: Who is involved?
Land preparation?
Planting
Weeding?
Harvesting

Ownership:
Land Plants
How long

Other persons rights?

Field Observation Notes

**ANNEX II.**

## QUESTIONS FOR GROUP INTERVIEWS

1. How do you consider wild yam cultivation? Easy? Difficult?
2. How many have cultivated wild yams?
3. How many have not but would like to ?
4. How many plants produce one basket for the market?
5. How much is a basket?
6. What varieties sell best?
7. What varieties are easiest to grow?
8. What varieties produce the most?
9. Can one grow wild yams under every tree?
10. Would you be interested in growing wild yams as a commercial crop?
11. Any comments?

**ANNEX III**

WILD YAM NARIETIES - Field Identification Notes

Variety: Local Name Species

Location: Area:

LEAF

Shape Size

Vein Lamina/Stalk

Surface: Upper
Lower Arrangement

Phylotaxy

STEM

Direction Surface

Cross Section Base

Colour

TUBER

Numbers Surface

Shape Size

Cross Section

Colours: Outer Skin As Food:

Inner Skin Texture

Flesh Taste

Appearance

Other Notes.

**APPENDIX IV**

# *MEETING OF POLITICAL LEADERS FROM NORTH AMBRYM ON JULY 27TH AT AREA COUNCIL CHAMBERS AT NOPUL FROM 2:30 PM TO 5:15 PM*

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Letter of invitation sent to:

Simeon Lakon, Chief Lui Wanbe, Mitchel, John Masing, Titus Bato, Andrew Welwel, Daniel Bangtor, Tokon Simeon, John Rawo, Harry Tekon, Moses Telebu, Luan Thompson, Chief Sawan, Olsen Talsil, Chaelsen Sari, Jean Batiste, Victor (Nazareth).

## A G E N D A

1. Future of North Ambrym
2. Local Council (1972 - 79) vs Island Government Council (1983 - 1993): A quick comparison and the the upcoming "Decentralization Act".
3. Other business.

Agenda 1:

Welcome by Area Council Secretary on behalf of himself and government.

Introduction by John Salong of why the meeting especially as an outcome of consultation with people after the popular theatre performances where people are asking that leaders to meet, linking to agenda.

Titus Bato proposed that other business be left as it was to be suggested after agendas 1 and 2.

*John Salong* North Ambrym has to be looked at carefully. A future has to be described. Example of political representation in parliament. North Ambrym has 48% of Ambrym's population but no consistency in the last 13 years in having an MP from the area. West Ambrym has 30% and South East Ambrym has 22% and has consistently had an MP from South East. Why? What future do politicians see for North Ambrym.

| | |
|---|---|
| *Andrew Welwel* | Politicians who have not spoken a lot should speak first. |
| *Titus Bato* | Make a round and hear everyones' views especially start with the oldest; Wilfred Koran. |
| *Wilfred Koran* | North Ambrym is not moving because people are not joined together. Another reason is because politics has become too strong in peoples' minds. Once a party has won elections, people do not join with it to work, but continue to politic. |
| *Chaelsen Sari* | Nagriamel was the first party. The work of Nagriamel has slowed down because of politics. |
| *Lengkon Johnson* | Next general elections, UMP will put a candidate from North Ambrym in 1995. |
| *Luan Thompson* | People of North Ambrym are not voting in their constituency because they move to Vila and Santo at the time of the general elections. Also no MP has been coming from North Ambrym simply because of parties splitting votes. |
| *Moses Talebu* | People who are leaders in political parties continue to cling onto political parties even when they recognize that they are doing wrong. Because of this, there are too many parties that split and divide their people. If people get away from what is wrong, it will not be a problem to have an MP from North Ambrym. |
| *Andrew Welwel* | Everyone feels that someone should be in parliament from North Ambrym. This is because of political development if comparison is made of people of North Ambrym to South East Ambrym, it will be seen that in South East Ambrym people listen to chiefs. Also, there is only one church group in South East Ambrym. These two factors contribute to the people having an ability to agree on an MP. They unite and work together.<br><br>North Ambrym has many churches and political parties, so they cannot work together.<br><br>The best way to guarantee a member of parliament from North Ambrym is to have an agreement for rotation of candidates sponsored by political parties.<br><br>After election, all political parties should work with their representative in parliament |

and MPs should be genuinely interested in representing people. This means that all political parties should meet MPs representing North Ambrym regardless of which party the MP is affiliated to. In the two years as MP it was difficult to work in North Ambrym because people never invited me to come and visit. If I did a tour on my own, they asked questions to do with national politics or hand outs but did not give ideas for the development of their area.

The conclusion is that there must be a different way of work possibly along party lines so that each area of Ambrym can have an MP at one time or another.

*Titus Bato*

Our division is part of our tradition of competition between rank takers such that it may not be possible to work together in future to have a common goal such as sending a local representative to parliament. Our grandfathers were divided so shall we, unless we become real Christians.

*Tokon Willie*

Maybe political leaders are giving wrong advice to the people. If some leaders stop people from exercising their rights, and don't show a good life there cannot be cooperation, but if leaders do cooperate, it is possible that things will be better in North Ambrym. If North Ambrym falls down, it is the fault of leaders. Leaders must not be selfish, they must look at peoples' needs at the village level. It is good that political leaders start working together today so that people can cooperate in future.

*Andrew Welwel*

If we look at history of politics in North Ambrym, we can say that people in North Ambrym do not necessarily vote for candidates from North Ambrym. They will intentionally cast their votes for another person just to ensure that the candidate from the area loses. People in the same party cannot respect the boundaries given to them to vote in.

*Moses Talebu*

There's no pride in being from North Ambrym so candidates cannot become MPs because people of North Ambrym vote for candidates from other areas.

*John Salong*

What I am hearing is that there will never be an MP from North Ambrym. But when I talk with the people, they are saying that there should be an MP from North Ambrym. Leaders should work together. If the political leaders say that they cannot work together, how do they see

the future? What are we going to do with the rapid population growth we face today? Where are we going to house everyone? How are we going to feed everyone? Is it possible that political leaders of North Ambrym forget party politics and work for the good of the people of North Ambrym or not?

*Moses Talebu* — It is possible.

*Andrew Welwel* — It is not possible unless we change the system of politics such that our representatives are not politically based. Maybe we can use chiefs such as the Shepherds where if leaders go to another political party, every follower will change to the party chosen by their leader. I believe that if we try to hold another meeting and try to come up with consensus, it will not be possible to unite. As I stated before, this individualism is part of development. I'm not saying it is good or bad, but it is the reality. Look at today's independence anniversary celebrations, it is split where a group is celebrating at Olal and we are here, because they do not respect the decisions of a small committee. Maybe if all political parties were eliminated, we could work together. The reality is that we were split before independence.

*Titus Bato* — The only thing that can be done is that the issue be forced such that Ambrym have three instead of two MPs. This will ensure that an MP be from each area. We are not all registered, if we were, maybe there could be one more MP from Ambrym. It is not possible, it is in our blood.

*John Salong* — If we cannot agree to work together, then we as leaders are not responsible. Is that right?

*John Masing* — Maybe in the area of political representation we can say that it is simply because people don't vote.

*John Salong* — But, why is it that people don't vote?

*John Masing* — At the time of general elections, at close to half the population moves to Vila and Santo, so in reality, we do not make up 48% of the voting population of Ambrym.

*Chaelsen Sari* — I agree that the voting population is smaller than the registration count. This means that it is difficult to work together because people do not participate.

*Andrew Welwel* — It is our character not to work together. In

the last general elections, Daniel Bangtor (from North Ambrym) was beaten by Jack Hopa (of South East Ambrym) by five votes. Those five votes difference probably came from North Ambrym. This was so in my case where 14 people of the same party as myself voted for another candidate just so spoil the votes maybe because of bribery. But I come back to your first point where you said that if political leaders do not work together, it will not be possible to work to protect the environment. If political leaders do want to represent peoples' interest, we have to do some of these things. Look at the issue of the airport. A lot of ground work was already made to have the airport, but just because some political leaders want to take credit for the work, there's no airport yet. It is the political leaders who are selfish. They are no good. We are not good.

*Wilfred Koran* I see and agree with Andrew's point that there has to be a change in our system. But we have to have good dialogue with the chiefs. The chiefs have to hold people together. When I was a chief, there was no such problem. My word was respected from Ranvetlam to Konkon. Maybe because of lack of education. I said that every Thursday, I wanted the road cleaned. It was done! When I walked around there was no dirt to be found. But now it is too hard. I am not against the chiefs. They do work, but they work differently. They do not think about people. There is a high population growth as you said, but these big chiefs do not think about people. I'm not trying to discredit them. I'm an old man I can say what I say. All they think about is themselves. The chiefs only fix up problems where they will collect fines. They never work with the people. When we did our jobs as chiefs we were kind to people. Everyone was our son or daughter we talked well with people, we were kind to people. You who are educated are saying that division is part of history. You cannot, you must not say that! That is not true. If you as a leader are kind to your people, they will carry you high. Even if we change our system, it is still the chief that has to speak to the people. Why is it that the chief of Fona cannot speak the same as the chief of Magam. This is because of politics. People here think that politics is for fighting, to spoil other people. That is not politics. Politics only comes in the selection of a government. After general elections, the family has to be OK. We have to change the system.

*John Salong* I agree with grandpa. All these points being

raised in our discussions with people oblige politicians to work together. If politics continues in this manner, what is going to happen to the population? What will happen with the health care? We cannot all go to Vila. We cannot all go to Pentecost. Some people must remain in North Ambrym. There are some problems coming up, what will happen when political parties continue to split the leadership and population, when churches split the people, when chiefs do not do their job, they play politics. It is my belief that reconciliation is in the hands of the leaders. This is because if leaders agree to work together, I don't think there will be a problem. The population is asking leaders to work together. Why can't people work with the chiefs like before. Leaders worked with family not politics. If we agree that we cannot work together in selecting an MP, we still have to agree to work together to meet the needs of the people we serve. This meeting is to start us thinking about the future. I believe that in 15 years time, someone in Ambrym will be hungry. That person is not going to come from Vietnam. S(he) will not come from Ethiopia. (S)he will be a relative. It is the responsibility of leaders to find a means of working together to meet our needs. Today we divide because of politics, church and land. We forget the future. We are not protecting ourselves.

*Titus Bato* — It is true, we have to change the system, it is good that you called politicians together, but the invitation should have been extended to chiefs, to church leaders, to youth and women leaders. Politicians can change anytime but it is the chiefs, those who kill pigs, who cannot change. Next meeting has to include everyone.

*John Salong* — I believe that the traditional leaders are asking that we work together. Look at the list of ideas coming from Fanla.

*Wilfred Koran* — I said it in the beginning...cooperation. I have not seen a kind person for a long time. If you go to Banks or Vila and ask if they know a Wilfred from North Ambrym they will tell you that he is a kind person. I am not boasting; I'm just saying that when I was chief, people liked to work with me. When I judged, I made sure everybody was satisfied. I have not seen a kind person in a long time. Thanks for coming. In all these meetings, I've never spoken. But today I speak my heart. Today I see people, I do not react well. Why? Politics. Politics has spoilt our livelihood. Today we have to stop fighting, be humble and

support each other. Thank you. God knows I speak my heart. I love all our people.

*Andrew Welwel* The two MPs from Ambrym must come together to the people - not political parties. We are playing politics without knowing whether we represent the genuine interests of the people. We are not looking after the long term interests of our people. Everything will be corrupted and abused if we don't change what is happening. This week two celebrations is not good. I've asked people of UMP to hold people together so MPs have to come to get ideas from the people. Who is going to be respected. If you do not respect the independence organizing committee, who will you respect? It will be good if we cooperate.

*Wilfred Koran* We have to work it slowly. Get the chiefs to hold people together in their Monday meetings. If we continue the way we are going, North Ambrym will continue to be nothing, we still have time to work. We must do it. If not this big population will continue to be nothing. I will die but you will see problems we have never seen.

We must continue to work. Politics has a limited time. Leave politics alone. Leave out political party.

*Chaelsen Sari* If we all forget politics and work, we will be OK.

*Wilfred Koran* United we stand divided we fall. We say that "Long God Yumi Stanap", today we are very far from God.

*Andrew Welwel* We started something where we are writing down rules to govern our village. The youth and the women are protesting and one of our chiefs has resigned but this may be the place to start. We must unite people starting from the village. Chiefs have been politicised. Maybe it could be good to start by having a leadership seminar for the chiefs. We cannot start to talk about unity at the top level. We must talk from the village upwards.

*Wilfred Koran* We have to go back home. After that, we will see what the chiefs are saying. People looked well at each other before.

*Tokon Willie* The kind people you are describing are only few. There are a lot of bad people. Church leaders preach love, but when they go behind a coconut tree, they speak hate. Chiefs do the same thing. Chiefs used to help each other by reinforcing their words. Today they compete

and challenge each other. The problems are the leaders.

*John Salong* Leaders are only outward looking. For example, the people are asking that rules governing the environment be enacted. Who is going to enact them, the chiefs or is it the government? What about all the rules set down by our ancestors, we continue to trample on those. When people are asking the leaders to unify, who will call their meeting without the meeting being labelled a political or a church meeting? Why do we split? Politics.

Today we are talking about political representation, but we haven't mentioned land struggle. Today it is a war of words, what will it be tomorrow? If we continue to divide, it will end in bloodshed. What I've been hearing from people is "Leaders". Leaders should do this, leaders should do that. It is now the responsibility of leaders to do something. How are people going to get the leaders together? How and who is going to call a meeting of all leaders? Who is going to do the list of ideas that people are generating?

*Wilfred Koran* I have already said it. Cooperate. Some old people say things that are not true. I have to say this, if you are kind, if there are ten kind people everyone else will follow. Love, Jesus's commandment, can change all these people. There's nobody here with love. If people had love, they would work, pray, and all would change.

I am 89 years old. In my chiefly days, when I spoke, people did everything to support me. Why? Because of my kindness.

*John Salong* It may be appropriate at this juncture to move on and talk about the Ambrym Local Council then talk about Ambrym Island Government Council and see which is best for our needs.

*Moses Talebu* I was the secretary and treasurer of North Ambrym Local Council. It was simple, it was only an area organization. We did the budget and sent it to Lakatoro to be rubber stamped. Then we raised and expended our monies. Administration and travel was minimal. Virtually all the money went into community projects such as rain catchments, road maintenance, aid posts, hand tools, and so forth.

*John Salong* Councillors were chosen from all the villages. After each council meeting, a village meeting was held that night to report to the village

people and get feed-forward-feed-back. The councillors were not paid.

*Andrew Welwel* Today's Island Government Council has a bigger area of responsibility but no power. The council cannot have a budget controlled locally. All monies have to be accounted for centrally.

*John Masing* Ambrym Island Government Council is good but it is frustrating because people expect me to be able to help with community projects but I have no discretionary powers. This area raises 880,000 Vatu per year, but has no power to use it for community projects. All of this goes into administration and travel.

*John Salong* With this comparison, which is better as a system for North Ambrym?

*Andrew Welwel* Obviously, the local council was better but our laws do not allow such an operation to exist today. Moreover, the present government has further undermined the powers of island government councils by taking away head tax. To top it all up, the upcoming decentralization act will take more power away from the area of North Ambrym, where we will have to compete with people of Malekula to be heard.

*John Masing* There is a way available where area council of chiefs can set up an area institution along the lines of local councils to do the work that used to be done.

They collect about the same amount of money as the area council from court fines. This could be put to good use. This institution could be parallel to the North Ambrym local council, but I don't know if this would be legal or not. If leaders do work together to do such work, it may be better than the area council. This is because if I do not deliver to the people in my capacity as area council secretary, people do not pay for licences. Maybe such an institution can even make a loan to develop the place.

*Wilfred Koran* We have to understand that such achievements are possible if there are good explanations. A lot of us do not understand your big words. If you take the time to work through these meanings with us, we will understand. We have to talk together and put everything clearly and simply to the local leaders - chiefs-then we can do it. Even the young people pretend to understand but they do not really. This is really clear that we should stand alone. We should stand united to get the central

government to understand. Get the central government to realize that it is not meeting our needs and that we have to find our own ways. But people do not understand.

*John Masing* The only problem I foresee is that it will stop the Presbyterian Church. I am not opposing the Presbyterian Church. I am just saying that it taxes people. Unlike SDA which is dependent on tithes (10%) given by people, Presbyterian Church taxes people. So such an institution will compete directly with the Presbyterian Church. In taxing people. But we may not agree to do such a thing.

*Chaelsen Sari* We have tried at the island government level to set up village councils. But this is yet to be cleared in how it works in relation to other organizations it is also not clear what will comprise a "village" because of local disputes.

*Andrew Welwel* Village councils will not differ from other associations in that the local chapters can pay membership fees to be part of a larger area body. The village councils can get money from fines and penalties for breaking village rules like the ones we have started. Also chiefs will get sitting allowances but will not pick up all the fines paid like it is currently done. After a court session, chiefs distribute all the take. On chiefs' day they don't have any money to spend.

*Chaelsen Sari* The village council will even look after aid posts.

*Andrew Welwel* Maybe this is a solution, to look at organizing at the village level. You should call a meeting of all the chiefs to say the same things you've told us, if they agree, we can use this concept to do develop community projects.

*Titus Bato* Village council will start at Wilit village. Policies are being drafted. Island government council will have a budget to start off.

*John Salong* Because we are not organized, we don't ever access for example South Pacific cultures fund. We don't have a plan. In my mind, it is not difficult to find assistance. But it is difficult to start working together.

I am happy with the suggestion the next move is for me to send a copy of what I am hearing to different leaders and let them decide where to go from there. I have no authority to call meetings. I went out of line to call this particular one. But I see a problem, it will

not be long before everyone has no credibility.

So at the level of politics, you will have to decide what to do. If anything is to happen, it must happen at the local political level.

*Chaelsen Sari* — So who is going to call the next meeting and when.

*John Salong* — That is a question for all of us to answer.

*Andrew Welwel* — It is a question for all of us. In my mind, a person who is not involved in politics should be able to draw everyone together, but this has not been the case in this meeting. However, if we don't decide on a meeting today, this initiative will die. Maybe one date can be if our two MPs come to visit.

Personally, I go to all meetings. But other people may see a meeting as being of a group they do not and should not belong to.

*Moses Talebu* — At the village level, we should start talking about village councils. At the area level, we can have another meeting to combine everybody's idea. We can check about the legality of such an institution but that shouldn't stop us from starting.

*John Masing* — When I gave the right to John Salong to hold a meeting at the area council chamber, and because he left the ideas, here, the area council and area committee should call a larger meeting to decide what the future of the area is.

*Andrew Welwel* — Maybe that is where we should leave it. The area council will be responsible for calling the next meeting which should invite the chiefs, political leaders, youth leaders, women's leaders. The topic should be to discuss the future of North Ambrym.

*John Masing* — It is a new idea that has to be looked at. We don't know if this will be legal or not. But if it works we will work.

*Andrew Welwel* — We are too dependent on the government. We can have an NGO that will have a project officer to solicit funds from outside agencies. I think this meets the problem I've been thinking about; how to access external funds - as long as it is legal.

With an NGO we can work. This will have nothing to do with politics.

*Wilfred Koran* — I hear you people, if it is clear, people will respect it.

*John Salong* — Ambrym is rich. In handicrafts alone, Ambrym gets 11-13 million Vatu each year. But where is all that money?

People divide over politics, church and land. As a result Ambrymese who get that kind of money go and spend it all in Vila. Maybe it would be different if we worked together.

As shown in the play we showed, if we are divided, there can be no incentive even to vote in North Ambrym.

We don't even have to look at Australia if we work together and utilize the funds we generate.

*Wilfred Koran* — We usually say this. If we hold together, we can develop ourselves by protecting these things.

*Titus Bato* — Next meeting will be called by area council secretary where councillors, chiefs, political leaders, women's leaders and youth leaders will all be invited.

Closing Prayer.

**CONCLUSION**

The meeting had a representative from all political parties except for Tan Union. The UMP, VP, MPP and Nagriamel were all represented.

I believe it was good in that it put the ball into the courts of the leaders at the level of the area council. It remains to be seen how the game is played.

Some very good ideas that can be developed out of the meeting are:

1) Organize a leadership workshop for the area council of chiefs

2) Look at the legalities of having an NGO that does exactly what the North Ambrym local council used to do between 1972 - 1979

3) Call a meeting of all leaders to discuss the concept of village councils and contribute to the drafting of its policies

4) Invite the two MPs from Ambrym to come to North Ambrym together to meet the people

All these initiatives could be understood by the UNDP and the NPSO within the parameters of their work. So please distribute to them if they are interested.

**APPENDIX V**

# ONE WORLD

## An environmental awareness programme for the Pacific

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PRODUCER : CAROLYN COURT 26TH JULY 1993

Welcome to "One World" Radio Australia's Pacific Environment Programme. I'm Carolyn Court, thanks for joining me.

On "One World" this week reactions to United States President Clinton's decision to extend the moratorium on nuclear testing and the possibility of a comprehensive ban on nuclear testing being developed.

Also on the programme a focus on a new initiative in the South Pacific, the Profitable Environmental Protection Project. We will hear about the background to this strategy and take a look at a particular example of a PEP project in Vanuatu which aims to preserve an endangered species of palm only recently rediscovered to science.

Earlier this month the United States President Bill Clinton extended the American Moratorium on nuclear testing by at least fifteen months. He also asked France, Britain, Russia and China to join the U.S. in this moratorium.

In response to this request Russia has extended its moratorium and the French have said that they will continue their moratorium if other nuclear testing countries also take this course.

China however has not agreed to the moratorium though the country has said that it will use restraint in developing it's nuclear testing programme.

President Clinton is also pushing for a comprehensive test ban and he's taken the first steps in a process working towards achieving this goal.

Stephanie Mills from Greenpeace, New Zealand, spoke to me about the follow-up to President Clinton's moratorium decision and the French position on further nuclear testing in the South Pacific.

Produced for RA by PRN with the assistance of AIDAB and in cooperation with SPREP

MILLS: Well I think Clinton's decision seems a very strong message to France that testing in the Pacific is not on for the future and specifically you know Clinton has followed up has called for a global test ban with the sending of a testing ban negotiator to all the capitals of the Nuclear Weapons States including France and so he's obviously prepared to take some action on this issue.

I think the French establishment is quite divided about whether to continue testing or not and really it's up to us down here in the Pacific to continue the pressure to make sure that testing doesn't continue.

COURT: Yes, as far as the French political arena, what sort of pressures have there been on the new Government to actually not carry through with the moratorium?

MILLS: Well just before President Mitterand responded to Clinton's call for a test ban and said that France in fact was also in favour of that, well just a couple of days before that a Parliamentary Commission had recommended that France resume testing after its year long moratorium on Mururora and so President Mitterand is a little bit on his own in this, he does make the final decision as a Commander Chief in the French military and it has definitely been seen to be a perogative of the President to make decisions about the defence such as testing or not to test. But the Prime Minister Mr Ballaour is obviously under considerable pressure himself from his own party which is a conservative Party and so I think the compromise that has been hatched to some extent is that in announcing that France was supportive of the call for a test ban, President Mitterand and Prime Minister Balladur also announced the setting up of a Commission looking at what the impacts or what the necessity for the resumption of nuclear testing was for France.

COURT: And obviously the outcome of this Commission could make quite a difference to which way France goes in the future on this.

MILLS: Yes that's true and the seven people on the Commission are unfortunately quite balanced towards favouring the resumption of testing and they're drawn mainly from the military and from the Atomic Energy Commission and so they will have to drawn up an inventory of the kind of nuclear weapon that France is planning for the future and what consequences the moratorium would have on those plans.

And so I think that this Committee in a sense may have been if you like a token effort to the right wing to say well you have got your chance to air your views through here but I think that we were hoping that international events and the international pressure towards the testing will actually if you like catch up and before this Committee maybe even

reports back and that France will be politically committed at an internationa level to a test ban and therefore resuming testing will just not be a political option for either Mitterand or Prime Minister Balladur.

COURT: President Clinton is, he's talking seriously it seems about developing a comprehensive nuclear test ban, what are the indications that he really is prepared to carry through with that?

MILLS: Well he sent a special negotiation to the capitals of the nuclear testing states and that's been a pro-active effort to get people to commit to a test ban. There were also various fora internationally in which the test ban can be advanced.

One is the Geneva Conference on Disarmament and the other is the Partial Test Ban Amendment Conference and so those are two processes that the United States may well use if you like to get the actual mechanism of a Treaty underway fairly swiftly we hope.

COURT: What could be the main barriers to a test ban?

MILLS: Well I think you can divide them into two categories. One is resistance within the States that are currently testing themselves so for example with the military in France, the military in Russia and the fact that China really hasn't been drawn on what it will do and is possibly going to test later this year, so there's, if you like, resistance from the military and defence establishment within the current testing nations to any total ban on testing and then there may well be some concern about how comprehensive the test ban can be in terms of pulling in countries that are what we call near nuclear or threshold countries.

Countries like Pakistan, Iraq, Iran are the couriers who have nuclear capasility and may or maynot have developed nuclear weapons. So they've got the technology, they've got the materials and it's really a question of whether there is a political will to bring all those parties in and make sure that they commit to a test ban as well.

COURT: Stephanie Mills from Greenpeace, New Zealand.

You're listening to "One World" Radio Australia's Pacific Environment Programme. I'm Carolyn Court.

THEME

The non-government group, the Foundation of the Peoples of the South Pacific is currently working with communities in the region to develop to what there calling Profitable

Environmental Protection projects otherwise known as PEP projects.

These projects aim to preserve important conservation areas while also helping to provide private enterprise opportunities for local communities and there are already some exciting examples developing in Vanuatu including that one that we will talk about today which aims to save a seriously endangered palm recently rediscovered to science.

To find out more about the regional PEP project, I spoke with Dr. Nora Devoe, former research forester with the United States Forest Service and now working with the Foundation of the Peoples of the South Pacific as the Conservation biologist and PEP Project Manager.

Dr Devoe begins by explaining why the conservation movement has gradually turned to this type of development model.

DEVOE: The developed countries in the seventies and right up into the eighties, the strategy of the conservation movement was basically to put a fence around it, to ask people to just resist using their own resources and gradually we learned that there are not very many societies that can afford that and that the approach of just putting a fence around things really doesn't work and so now the PEP project is operating on a little bit newer model which is to allow people to have access to the resources and to meet their own needs and to generate cash from the resources but to try to encourage them to do it in a way that ensures that they can continue doing it in the future.

COURT: And it what areas geographically will it operate?

DEVOE: PEP is a regional project funded by the United States Agency for international development and it's designed for three countries in the South Pacific region. We've elected two countries now, Vanuatu and Papua New Guinea and we are evaluating three other countries as a third choice.

COURT: Well to date, what sort of projects are you considering?

DEVOE: Well, we have a range of projects. Here in Vanuatu we are looking at a series of small private enterprises aimed at providing alternatives to cash cropping and expanding garden areas in one site as a forest conservation project, we're looking at a small scale horticultural type enterprise to protect a single endangered species which is the palm carpoxylon macro spermum.

In Papua New Guinea we have a sustainable fisheries village based fisheries project, several other agricultural and handicrafts and so on.

COURT: Let's just switch to the palm project. Could you tell us where that is at at the moment in the process so we can get an idea as to how a project can develop.

DEVOE: Yes, I can tell you a little bit about the history. The Government of Vanuatu's forest botanist brought to my attention that a rare species had been identified here and had a very small population and she suggested that maybe the PEP project could do something to ensure the survival of the species and it just so happened that this palm, one of the sights where its known to grow is the family land of another forester, a local forester, and so the three of us had a meeting and we had a talk about it and then we all went to look at this palm and where it grows to figure out whether we might in fact be able to do something to encourage people to propagate it and so we are thinking about maybe doing some kind of a seed or seedling sale business to provide an incentive for people to grow the palm and certainly to recognise its importance and so where we are now is basically planning the business intervention with the community and with the project staff.

COURT: Dr. Nora Devoe, Project Manager for the Profitable Environmental Protection Project. Before we hear from Livo Mele whose lucky enough to have some of these palms on his land, I spoke with Pat Curry an English Botantist who is currently working with the Forestry Department in Vanuatu.

She explains how the palm, which until a few years ago was thought to be extinct was rediscovered recently to science.

CURRY: The rediscovery was by John Dowle who works in the Townsville Botanic Gardens. He was researching his book, "The Palms of the South West Pacific" and he was travelling in South Santo and by chance somebody he met told him that there was a palm close up which he could take him to see and when John actually went to the site, he found that it was a palm which had only previously been known from a drawing in a book which was published in 1875.

COURT: How did you make connection with that information?

CURRY: Oh alright, well he's published the book "Palms of the South West Pacific" and I also wrote to him and he wrote back emphasising the importance of this particular palm because so few trees are known to exist.

COURT: And you actually visited the village where some of the palms are found I believe.

CURRY: Well, what happened was we went down and had a look at the palms and we talked to the villagers who on whose land the palms grew and we carefully enquired about the source of

the palms and it was quite an interesting story.

The grandfather of Livo had gone from the village to study in the missionary school which was on a small island offshore. Meanwhile the, what's called the "curse of the missionaries" hit his village and killed both the people in the village, that is the diseases that came at the time when the missionaries were working here. Livo's grandfather then went to work on another island but came back to his custom land and planted some seeds of this palm. Nobody knows why and nobody knows where the seeds came from. There is a palm growing on the island, its Tangoa Island but nobody knows where that came from.

COURT: Well Pat, I believe that you confirmed John Dowl's information by talking with a world-palm expert in the United Kingdom, was he enthusiastic about this palm?

CURRY: Yes, that's John Dransfield who is based at Kew Gardens. He's very excited about the project. It seems that the carpoxylon macro spermum is a palm which is part of a group of palms which are based in the south-west Pacific and there seems to be a centre of diversity of this group of palms here and many of them only grow on one small island which is what is thought is the case with this particular palm.

COURT: Is this palm just found in Vanuatu?

CURRY: Well it's not really known where it's found but we think it is only found here, it was originally found on Aneityum in the south and the cultivated palms that we found are on Santo and there are reports that it's cultivated erromango and ambac?

COURT: Could the plant become extinct? if there isn't any action taken.

CURRY: Oh I should think that's really quite a high possibility, yes. It's possible that there are populations growing in the wild, growing in the bush that we haven't located yet and so we are going to be looking for those in the next year.

COURT: Pat Curry, Botanist with the Vanuatu Forest Department talking about the good news of the rediscovery to science of a type of endangered palm. Certainly good news given the number of plant species that are being lost to the world everyday.

As Dr. Davoe mentioned one of the sites where the palm is found is owned by the family of a person working in co-operation with the Vanuatu Forest Department, Livo Mele. For Livo these palms in his village in the south-east corner

of Santo, the village is called Casseveia these palms were just part of his daily life. They were simply known as the palms with the big fruit. Fruit that was apparently eaten by coconut crabs, flying foxes and to a smaller extent by people.

Livo explains why he believes the palms should be preserved.

MELE: Oh I think it should preserve and because if it's one of the rare species you know other people, people from other places might see we are fortunate to have this plant in our place and I think it is important that we should preserve it so that other people might see that's it from the community that they come from.

COURT: It sounds like it's quite a coincidence, it's quite lucky that it's actually on your land.

MELE: Yes, I think it's lucky that I work with the Forestry Department, I'm a bit familiar with some of the plants and to know that this species is a rare palm, I think. So I really appreciate the fact that it is on my land.

COURT: Now I believe your Uncle actually shares your interest in the palms and could you tell us how, he's already been attempting to actually grow them hasn't he?

MELE: yeh, my Uncle, there has been many, there's been some few peoples coming around the area and visiting the palm they have been telling my relations that the palm is unique and it is only endemic to Vanuatu and that's why the people in the village, some of them got stirred up by the information that these people give to them, that's why the people in the village have begun to raise the seedlings. Some of them now are trying to raise the seedlings up to try and replant the seedlings because before this I think the children, the kids used to go and eat the nuts from the tree and that's why there is no seedlings growing at the site anymore.

COURT: Does the palm actually look very different to say a coconut palm?

MELE: Yes, the palm looks a bit different from the coconut palm, it's like the other palms that used to grow, it's like the smaller palms but the only fact that its different is because of the fruiting system, the fruit is a bit bigger than the smaller palms.

COURT: How do you think this project, the PEP project could help to ensure that the palms survive.

MELE: Well I think if the project, if they helped in assisting us in raising up the seeds and also they find

somewhere where we can sell the seedlings to, also if they help us with the information that the seedlings, that the palm is rare they can help us to raise the seeds so we can sell the seeds to some of the botanical gardens, so we can plant the seed ourselves in the areas that we think the seed can grow.

COURT: Livo Mele, he was speaking about the endangered palm known by its scientific name carpoxylon macro spermum

And if you have got any ideas about a conservation project that could help preserve biodiversity and might fit the PEP Project criteria, the Foundation for Peoples of the South Pacific may be interested in hearing from you.

Dr. Nora Devoe from F.S.P.

DEVOE: We'd like to have projects that have been identified by rural communities themselves, that is where the initiative is coming from local people and it's their own idea either in response to some resource problem that they perceive or some particular, what I refer to as a Conservation opportunity protecting something which is rare or a habitat which is rare or important and especially in those cases where communities themselves have ideas were we're very interested but we also are open to projects that are identified for example by government agencies or other NGO's and pretty much anywhere in the South Pacific is game.

COURT: Dr. Nora Devoe from the Foundation for Peoples of the South Pacific. For more information about this project, Dr. Devoe can be contacted in Port Vila or write to me Carolyn Court, C/- of "One World" Radio Australia, Melbourne, Australia.

That's all on "One World" this week, bye for now.

ENDS

**APPENDIX VI**

# *TRIP REPORT*

## *July 12 - 23, 1993*

## *PAPUA NEW GUINEA*

**James L. Stead**
**PEP Enterprise Specialist**

PURPOSE

In November and December of 1992, Dr. Nora Devoe visited Papua New Guinea (PNG) to evaluate potential sites for PEP interventions from her perspective as Conservation Biologist. The purpose of my trip was to follow up on her trip evaluating the potential for successful enterprise activity. Two projects were visited. The first, previously toured by Dr. Devoe, was the Village Development Trust's (VDT) Lasanga Protection Programme. The second project, The Hiri East Coastal Zone Management Area, was brought to our attention by an attendee at the recent Monitoring & Evaluation seminar, William Asigau. Asigau is a former employee of PNG's Department of Environmental Conservation.

SUMMARY

VDT's Lasanga Protection Programme represents an excellent opportunity for PEP intervention. Established infrastructure and ongoing conservation awareness programs instituted by VDT provide a solid foundation for enterprise activity. Opportunities within the Hiri East project are limited. While this project would benefit from certain environmental and enterprise oriented interventions, the linkage is somewhat obscure. Modest conservation and enterprise activities, undertaken independently of one another, are indicated.

CHRONOLOGY

Monday, July 12, 1993

In the morning, I met with The Foundation of the Peoples of the South Pacific's (FSP PNG) David Vosseler. Now Director of Programs, and formerly Country Director, Vosseler will be leaving PNG in September. Yati Bun, currently Manager of FSP's Ecotimber Program, has been appointed Country Director. It is not clear that the position of Director of Programs will be filled following Vosseler's departure. Sir Paulias Matane, Chairman of both FSPI and the Board of Directors of FSP PNG briefly joined our conversation. He evidenced no interest in PEP or its possible activities in PNG.

Vosseler expressed the view that FSP/PNG should have "control and responsibility" for any and all PEP activity in PNG. I told him that local FSP involvement depended upon the contribution they could make, and would be evaluated on a project-by-project basis.

Vosseler gave me an overview of FSP/PNG's programs, with special emphasis on their Ecotimber Project. He stressed the fact that PNG's Department of Forestry had become a "stakeholder", and that by funding the wokabout sowmil inventory part of the project, had "bought into" the program. (It was subsequently learned that only 30 - 40% of the promised funds had been forthcoming, and that it was doubtful more funds would be provided.) Vosseler feels that PEP could participate in the Ecotimber Project by: 1) funding a market study for ecotimber and, 2) funding a design study for ecotimber processing facilities. As these efforts hinge on the outcome of the wokabout sowmil inventory, I told Vosseler any PEP input would be contingent upon the completion of that inventory. It is my impression that FSP/PNG would prefer to locate one source of funding for the entire Ecotimber Project. In the afternoon, Vosseler hosted a meeting with David Leong, USAID/RDO/SP. Attending were Mark Thompson, FSP's manager of the Farm Area Resources Management Program (FARM), Yati Bun, Barbara Freeman, Program Assistant, USAID/PNG, and myself. Yati and Vosseler discussed the Ecotimber Program at great length, again stressing the fact that the Department of Forestry have "program ownership". Opportunities for PEP participation in the Ecotimber Program were again discussed; no action plan evolved.

Leong discussed both MARC and PIMAR, USAID programs that are, or will be, active in PNG.

Tuesday, 13 July 1993

I met with Rolland Maein, Director, Hanucraft in Port Moresby. Originally Government sponsored, Hanucraft is now a privately owned handicraft sales operation serving the retail and wholesale market, domestic and export. Export sales represent 70% of the business, with customers in the U.S., U.K., Australia, New Zealand and Japan dominating overseas accounts. Hanuacraft publishes a comprehensive catalog of over 100 items in a wide range of sizes and prices. Maein does all purchasing, saying that he has found no other way to assure product quality. He personally

processes all orders. Each order is acknowledged with a pro-forma invoice, and unless specified by the customer, he suggests a method of shipment and estimates shipping costs. Hanuacraft works on a 100% markup (purchase price to selling price, fob PNG). Maein believes that this is very conservative, and is possible only because of his long experience and the fact that he personally does all the work.

In the afternoon, David Leong, Barbara Freeman and I met with Morris Brownjohn, owner of The Net Shop in Port Moresby. This business manufacturers and distributes fishing gear to both the wholesale and retail market. Brownjohn is also the Director of PNG's Fisheries Industries Association. In this capacity, he works closely with the Government's Department of Environmental Conservation (DEC) and the Fisheries Department in revising existing, and developing new legislation relating to commercial fishing. He is also the driving force behind PNG's participation in the USAID funded PIMAR project.

I discussed marketing shark fins with Brownjohn, who said that Chinese merchants in Port Moresby purchase all fins offered to the local market. It is his opinion that a stand-alone shark fin project would not be economically viable, and that all parts of the fish could, and would have to be sold. He suggested that the meat could be slurried (mixed with acid to break down fiber) and sold as feed for hogs and cattle.

I had dinner with an old friend from Vanuatu, Michael R. Grey. Michael is now the Development Economics Advisor to AIDAB, with the responsibility of defining all future PNG aid AIDAB projects. He commented that the level of education in PNG is higher than is other So. Pacific nations, and that the availability of trained people in virtually all disciplines is very good. On another issue, Michael said that the Asian Development Bank will soon offer new information regarding the value of So. Pacific timber. Projected values for the next decade will be revised sharply upward.

Wednesday, 14 July 1993

Traveled from Port Moresby to Lae. I arrived to find that Sasa was expecting me the following day (in spite of my fax indicating arrival on July 14th). The VDT truck had been stolen, and through no fault of his own, Sasa had been ordered to immediately vacate his office. All in all, he was quite undone.

We discussed the viability of VDT. It is my impression that VDT's funding situation is fragile, with no definite funding source determined beyond the next 3 to 6 months. He has made arrangements for two Peace Corps Volunteers (PCVs) to join the staff of VDT in September. A couple, the wife will work as an administrator and bookkeeper, while the marine biologist husband will work with the Lasanga Protection Programme.

When Dr. Devoe visited VDT and toured the Lasanga area, a tourism project was a major topic of discussion, and presented as the priority opportunity for a PEP intervention. A German NGO, German Development Services (GDS) had committed US$ 20,000 and provided a

volunteer to supervise the construction of a tourist facility on Lasanga Island. A conflict arose between Sasa and this volunteer regarding the type of construction to be employed in the facility, and also whether or not the volunteer would live in Lae or Lasanga.

Eventually, the volunteer left, and GDS is no longer participating in the project. The tourism project is in on hold; no immediate activity is foreseen.

When Sasa was in Vanuatu attending the Monitoring and Evaluation seminar, he told us that he believed that the village people in the Lasanga area were now interested in a fishing project, and that this was now the prime opportunity for a PEP intervention.

Thursday, 15 July 1993

Sasa and I spent the morning with Peter Jarchau, Director of the Momase Coastal Fisheries Development Project (MCFDP), and his counterpart from the PNG Department of Fisheries and Marine Resources, Barkley Kua, Assistant Secretary (officer in charge) of the Lae office. Initiated in 1987, the MCFDP's objective is to promote small scale fishing by supporting PNG's Department of Fisheries. This project is funded by a German organization, the Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ).

The project has researched many aspects of artisanal fisheries in the Lae area, and has produced extensive documentation of its work. I obtained copies of its Technical Report No's 2 and 4, Landing Data of Small Scale Fisheries At Lae Fisheries Division, covering catch data for 1991 and 1992. These are exhaustive reports statistically documenting the market fishery in the Lae area. I also secured a copy of a document entitled Overview of Marketing Situation.

Jarchau believes that creating infrastructure to support the artisanal fishery to be the most important task of their project. To this end, and in addition to the research, MCFDP has funded the construction of a fish marketing facility in Lae. This is a modern and well maintained building that receives all fish brought to Lae from the coastal fishery. It has facilities for weighing, and if necessary, storing fresh fish. Within this building, buyers and sellers meet to consummate sales; neither the Department of Fisheries nor MCFDP plays an active role in this marketplace. The project has also enabled the privatization of ice production, and assured a dependable supply of ice at very reasonable prices.

Jarchau and Kua assured us that the Lae market could and would absorb any volume of fish that could be produced from the Lasanga area. Jarchau commented that in spite of the combined efforts of the MCFDP and the Fisheries Department, there had been almost no increase in the amount of fish offered to the Lae market. They have conducted a variety of studies to determine why this is so, and can only conclude that if people have no immediate need of cash, they don't fish. They seem unwilling to accept this, and are developing complex studies to confirm this conclusion.

When asked about the success of individual entrepreneurs versus community fishing projects, Jarchau said that their experience with community projects had been dismal. Although he refers to "groups" when discussing successful projects, it is important to note that he defines a group as an individual who employs up to six fishermen. These employees are paid off at the end of each day, with payment based on catch weight.

After referring to various reports, Jarchau expressed the opinion that a fishing project in the Lasanga Area could succeed and generate good profits. He noted that in 1991, the community of Lababia (the northern most community in the Lasanga area) landed more fish at the Lae market than any other village. Since that time, production has lagged; he doesn't know why. Jarchau said that artisanal fishing can be highly profitable; it all depends on how much effort is expended.

When asked about shark fins, Jarchau said he never considered shark fin production as a viable component of the MCFDP. There are no buyers of shark fins in Lae. Normal shallow water fishing activity in the Huon Gulf produces virtually no marketable shark fins. Jarchau considers shark fin production a specialized adjunct to an altogether different type of fishery.

Jarchau says that they have an agreement with the Agricultural Bank (PNG's "development bank"), that they will assist all applicants for fishing related projects in preparing loan applications, and that MCFDP will give an opinion as to the viability of the project. To this end, they have developed loan application forms, cash flow projection and pro-forma financial statement formats.

Friday, 16 July through Sunday 18 July, 1993

During this period, we visited the site of the Lasanga Protection Programme. This 220,000 ha. tract rises from the sea to a height of 2865 meters. Stretching along the Huon Gulf coastline for 50 km., it extends inland some 30 km. Parallelling the shore and 3 to 10km off shore are a group of seven islands. The population of 800 is concentrated along the shore in 4 villages: Lababia, Kui, Buso and Siboma. Sasa reports that there are 22 km. of reefs in the area. Extensive reef systems are found between the islands, and limited fringing reefs abut the mainland.

Sasa, his faithful companion (and outboard motor mechanic) Sai, David Leong and I departed for the Lasanga area in a 21 foot Yamaha "banana boat" powered by a 40 HP outboard. Safety equipment consisted of a small paddle and flare gun (the latter reported, but never observed). Following a leisurely trip, we arrived in the village of Kui late in the afternoon. Villagers live in large houses constructed of local materials, and the village compound is clean and well maintained. Privies are constructed on stilts over the saltwater. A plentiful water supply is piped from a source above and behind the village; this system was constructed by a logging company. As the village is approached, it is obvious that all accessible forest (limited only by degree of slope) has been logged. Striking is the fact that it is not apparent that the village has benefited from income derived from this logging

activity. There is no clinic, no radiotelephone, jetty, or any other physical evidence reflecting gain from logging.

On Saturday, the Chairman of the Lasanga area conservation committee, Sasa, Sia, David, and myself toured the Lasanga area by boat. We visited Lasanga Island, were shown the sites of proposed tourist bungalows, walked into an area of undisturbed rain forest, visited other islands and areas of interest on the mainland, and called in at the village of Buso. We were able to observe the extensive reef system within the several islands lying off the mainland.

Fishing activity is carried on from outrigger canoes in relatively shallow water adjacent to the shoreline and islands. No fishing was observed in deeper water outside the islands. At no time were more than a few canoes observed fishing (perhaps 6).

Saturday evening, we attended a meeting of representatives of the 3 of the 4 village conservation committees (representative of Lababia were paying their respects to a recently deceased member of the community, and did not attend). Sasa acted as moderator, but did not appear to "control" the meeting. David Leong and I described the PEP Project. The committee, largely through its chairman, described the activities of the conservation committees. We were highly impressed with the level of organization of this group, and with their ability to articulate their objectives. It was obvious that VDT's 3 years of work in raising environmental awareness had made an impact. When asked what PEP could do to assist, a member of the committee, reading from prepared notes, stated that they wanted help in developing a fishing project. Specifically, they asked for help in providing for reliable transportation for fish from Lasanga to Lae, and 2) providing for reliable delivery, and subsequent storage of ice to the Lasanga area. In return for this aid, the conservation committee pledged that Lasanga Island would not be logged. We responded, saying that the aid they requested was within the scope of PEP's activities, and that we would consider their request. We returned to Lae the following day.

Monday, July 19, 1993

Sasa and I had a long meeting regarding the design and organization of the Lasanga Fishing Project. It was decided that we should be specifically responsive to the villagers requests. Sasa initially felt that a village based boat should be used to transport fish to Lae. I pointed out that MCFDP had a "carrier" boat that could pick up the fish, and that by using this boat, capital expense would be avoided. I also said that PEP would not pay for a boat and motor (an expense of K 6000). We agreed that we would ask for MCFDP assistance in securing the services of the transport boat. This same boat could deliver ice; however, it would be necessary to provide an ice storage chest (eskie) for each village. David Leong and I had previously discussed this, and had agreed that PEP would pay for a maximum of 4 eskies (one for each village) at a total cost of K 1000.

We discussed various organizational structures for the project. Ultimate responsibility is to rest with Sasa. VDT has an Department of Environmental Conservation employee on loan for two

weeks each month. This person's home is in Buso; he will act as on-site coordinator. In September, a marine biologist Peace Corps Volunteer will join VDT. This person will also live in one of the Lasanga villages and will provide technical assistance. Although the MCFDP staff feels that fishing practices now employed are adequate, the Lasanga Fishing Project may further evaluate this. The need for record keeping and report preparation was discussed.

Various schemes of compensating fishermen and paying for ice were discussed, however, no firm decisions were made. Sasa very much wants the project plan to be developed by the village people, this so that they are stakeholders and have project ownership. While agreeing in principal, I pointed out that we had an obligation to help the villagers make decisions that optimize their probability of success.

In the afternoon, I met with the Agricultural Bank of PNG to review their practices as they relate to loans for fishing activities. Equity requirements are 20 to 50% of total project costs, depending upon the credit history of the borrower. Interest is 11%, simple. The Bank will not make loans to community groups unless they are for profit enterprises with several years of documented success. It is clear that the Lasanga Fishing Project would not be considered bankable by this institution.

Tuesday, July 20th, 1993

Sasa and I returned to the offices of the MCFDP to review with them the proposed project. Attending were Peter Jarchau, Buckley Kua, and another member of the MCFDP staff, Dr. Kurt Wagner, a socio-economist. Both Jarchau and Buckley pledged the support of their organizations, and further agreed to make the services of their carrier boat available to the Lasanga Fishing Project. MCFDP staff expressed their doubt that a community-based project would succeed. I stressed the fact that VDT had been working in the community for 3 years, and that it was apparent that they worked together in harmony. I suggested that all parties should agree that an objective of the project would be to demonstrate that a community based project could succeed. We also discussed various schemes for paying the fishermen, with all agreeing that this was a critical issue.

Following this meeting, we returned to Sasa's office to further discuss the proposed project. This meeting included Mattus Kamung of VDT's staff. Sasa is to revisit the project site within two weeks and hold meeting to discuss the Project with the future participants. He will provide me with a report regarding the outcome of these meetings.

Wednesday, 21 July 1993

Met with Lucas Ramaso, General Manager, Kum Gie Corp. Ltd. Kum Gie is a small business service, providing training and business consulting. We discussed the Lasanga Fishing Project and the type of assistance Kum Giei could provide. Ramaso said they would be available to assist VDT as required.

Sasa and I met with David Faunt, a member of the VDT Board, to discuss the Lasanga Fishing Project. We also discussed the recent collapse of the wokabout somil manufacturer in PNG, with emphasis on the issue of supplying spare parts to somil owners. Faunt has a genuine interest in VDT's activities, and wants to be kept informed of the PEP intervention.

Late in the afternoon, I returned to Port Moresby.

Thursday, 22 July 1993

William Asigau, formerly an employee of PNG's Department of Environmental Conservation has for some years, been associated with a study of the Hiri East District, an area of Central Province adjacent to Port Moresby. The goal of this study is to establish a Coastal Zone Management Area to conserve Hiri East's natural resources.

The area has four villages spread over 50 km (straight line) of shore line. From northwest to southeast, these villages are Tupuseleia, Barakua, Gaile, and Gaba Gaba and have a total population of some 12,500. These people are Motus, and share a common language and religion. Economically, the area is a "suburb" of Port Moresby. It is readily accessible via a new EC financed highway, and has electric service. The majority of working men and women commute to Port Moresby by bus. Many older men, and those not otherwise employed, are involved in coastal fishing. Because soils in the area are poor and gardening relatively unproductive, fishing was traditionally, and remains, an important activity.

Traditional ways of life and community organization are rapidly disappearing. Although a clan organization persists, government is by elected village representatives. Leadership roles are described as being "very fluid". Traditional customs have largely disappeared, and the children are more and more influenced by a cash economy and television. Crime is an increasing problem.

Asigau arranged a meeting in Port Moresby of the four District Counselors and other representative of the Hiri East villages. A long discussion ensued concerning the ongoing conservation training in the four communities. The Counselors have a good general knowledge of the resource value of their reefs, mangroves and fishery, and are aware of the threats to these resources. Reef dynamiting and destruction of mangroves as seaside villages expand are seen as major problems.

Because of poor soil conditions and limited land availability, market gardening is not practiced. Fishing is the only significant source of income for the village people (other than working in Port Moresby). The Councilors said that they needed help in marketing their fish. Under the existing system, locally caught reef fish are transported to outdoor markets in Port Moresby, where they are sold in a free wheeling and undisciplined marketplace. The individual fisherman transports and sells his product; there is little joint effort. Ice is usually available at the market, where it is purchased and transported in eskies back to the villages.

In the afternoon, I had a meeting with Samuel Antiku and Laster Seri of the Resource Inventory Branch, DEC. Sari is the Assistant Secretary (director) for the Branch. Both of these men were involved with the design and execution of the work carried on by DEC in the Hiri East District. They confirm that the people of Hiri East are dedicated fishermen, and that assisting them would make a meaningful contribution to the community. We discussed the establishment of the Wildlife Management Area, a process defined by Government regulation. The process in Hiri East is largely complete, and it is hoped that Government approval of the WMA will be received within a few months.

Friday, 23 July 1993

Using a rented mini-bus, the four principal villages of the Hiri East district were visited with William Asigau as a guide. As we entered each village, we picked up the local Village Counselors and other dignitaries who accompanied us during the visit of their village.

The topography of the Hiri district is dominated by small (less than 300 meters), steep hills ranging from the shore inland several kilometers to an escarpment or abruptly rising hills. The low lying area receives only 40 inches of rain a year, and at the time of this visit was dry and dusty. Vegetation consists of grasses and a relatively limited number of tree species. Where hills do not drop directly into the sea, extensive mangrove forests prevail, often extending well inland in low lying areas. Thirty percent of the land visible from the highway had been recently burned and many fires were seen as we passed through. No one could explain this extensive burning ("it is just something the people do"). It may explain the reason for the limited number of tree species observed, in that only fire resistant trees can survive the frequent burning.

Well off shore, an extensive barrier reef system parallels the Hiri coast. Fringe and patch reefs are common.

All villages are located on the shore, and all houses built on stilts. Many of these houses are built over the sea; such compounds may extend out from the shore for 50 meters. Houses are built of both traditional and purchased materials, with new structures almost universally constructed at great expense from materials purchased in Port Moresby.

It is obvious that mangroves have been removed to permit the building of houses, and that this process continues as villages grow to accommodate the expanding population. Mangrove poles and firewood were much in evidence.

Fishing activities are carried on within this reef system; local fishermen do not venture beyond the barrier reef. The number of outboard powered boats, nets, and other fishing gear observed would indicate a high level of fishing activity. Although outrigger canoes were frequently seen, we were told that their use was restricted to transport around the village and for canoe races.

Saturday, 24 July 1993

A long discussion was carried on with Asigau regarding potential interventions. He has difficulty with the PEP concept that there must be linkage between the enterprise activity and the conservation problem. The following possibilities were discussed:

1. A market study to gather data leading to the optimization of financial return to Hiri East fishermen. This study would consist of two parts: 1) an analysis of the existing market system, and 2) a study of possible alternatives to the existing system. This second study would include a inventory of all potential buyers of fish and a review of the relative merits of each, an inventory of all suppliers of ice, and the relative merits of each of these. Alternative methods for providing transportation would be evaluated. Various schemes for joint or community marketing programs would be evaluated for potential effectiveness.

2. All fishing activity in the Hiri East area is described by both the village counselors and Asigau as "reef" fishing. There is concern that the reefs suffer from over fishing, while other resources are underutilized. It is suggested that an education program be developed and presented to teach other methods of fishing to the local people. The resource link would be the reduction of pressure on reef fish (although baseline data regarding the condition of the reef fishery is not available).

3. Funding a proposed program entitled "Investigating the Impacts of Fishing on the Marine Resources of the Proposed Hiri East Coastal Zone Management Area". Authored by Asigau, this study proposes to "....look at many different techniques used to remove and extract marine resources from the proposed area and assess their impacts on the marine resources of the area". A copy of this proposal is available in PEP's Vanuatu office. (Last week, Tim Werner of Conservation International (CI) met with Asigau regarding this proposal. According to Asigau, CI has agreed to provide funds in the amount of K 2000 for a discrete portion of this effort. Asigau is fuzzy (or at least not very forthcoming) about this.

Any of these three proposals would benefit the Hiri East area. The problem is that they do not directly link enterprise and resource conservation. To the extent that it is appropriate for PEP to intervene on either the conservation or enterprise side, without having a direct link, these proposals may have merit as PEP activities.

William Asigau is no longer an employee of the DEC; he has accepted a full-time position with UNDP. It would therefore be necessary to locate another facilitator to assist PEP. I was impressed with Antiku and Seri of the Resource Inventory Branch, and believe they would cooperate in locating a qualified person.

Sunday, 25 July 1993

Returned to Vanuatu.

# APPENDIX VII

# TRIP REPORT

# AUGUST 4 - 17, 1993

# KINGDOM OF TONGA

James L. Stead
Enterprise Specialist
(With Annotations by Nora Devoe
Conservation Biologist)

## PURPOSE

The purpose of this trip was to evaluate sites in Tonga for their potential for PEP interventions.

## SUMMARY

Two potential PEP interventions were found. The first was the development of a flyingfish fishery as an extension of an existing and successful fishing project. From a conservation standpoint, the project will transfer fishing pressure from currently over-used resources to an unused resource. The probability of proceeding with this intervention is high. The second intervention is assisting a men's group in Tongatapu in developing a garden plot that demonstrates appropriate land use and encourages tree production. At this point, the intervention lacks definition, and is less likely to be activated.

CHRONOLOGY

Thursday, 5 August 1993

Nora Devoe and I met with FSP's Country Director, Denis Wolff, and members of his staff: Seine Vakasiuola, Director of FSP's Tonga Community Development Trust (TCDT),and Peace Corps Volunteer David McDermott, TCDT's Environmental Officer.

TCDT's TREE Project was discussed in depth. This program is aimed at combating deforestation and promoting environmental awareness by involving participants in practical environmental activities. Evolving from this discussion was a PEP intervention concept that would establish village-based tree nurseries to produce trees and shrubs of ornamental, cultural, or economic (firewood, paper mulberry, and pandanus) value. This effort would be coordinated by TCDT's Village Women's Development Program, and would utilize members' custom lands and land owned by schools and churches. A visit to the local market confirmed that there was an established market for firewood, paper mulberry, and pandanus.

David McDermott described his project, which is to establish a forest reserve to protect a rain forest remnant at Taloa Methodist College. We discovered no enterprise activity that could be associated with this project.

We next met with 'Uilou Samani, head of the Environmental Planning Unit. Recently returned from five years of overseas study, Samani is obviously frustrated in his present position. He states that environmental issues are not a priority of the Government, and that lack of funds preclude effective action by his agency. In his view, government decisions regarding environmental issues are "all rhetorical, all talk and no action", and reported no change in interest and awareness over the last five years.

Samani feels that a lack of environmental awareness is the most important environmental problem in Tonga. His response to this is to "tackle the problem from the standpoint of beautification"; to create a "strong dose of tangible results to get public and leaders' attention". To this end, he has used his unit's limited resources to clean up litter and establish a number of ornamental plantings throughout Nuku'alofa, with the hope of attracting Government support and funding. While these efforts have attracted public attention, additional funding has yet to follow.

Samani was very much in favor of the idea of boosting production of traditional and economic plants, especially fuelwood species. He said that fuelwood is scarce on Tongatapu and prices are high. He was not happy with Forestry's use of exotics to encourage planting, and mentioned that his unit has established a botanical garden in Nuku'alofa. Their idea is to plant assemblages of native species in blocks by use: fuelwood, medicine, sawtimber, personal adornment, perfumes, tapa fabric and dyes, etc.

If a tree-planting enterprise is undertaken by PEP, Dr. Devoe would like to contribute a planting to this garden as part of PEP's environmental education for that intervention.

Friday, 6 August 1993

We visited the Department of Forestry's Tongatapu nursery, and met with Tavita Faka'osi, Chief Forestry Officer and director of the nursery, and his assistant, Leoty. Supported by New Zealand aid, Faka'osi's operation has encouraged plantation reforestation by providing seedlings, and provided saw-milling facilities to make possible economic utilization of mature coconut palms. Recently, the thrust of his unit's efforts has been agroforestry, with two programs being pursued. The first is directed toward management and reforestation of a 20 m strip of land extending inland from the high water mark around each island; this area is owned by the Government. To many landless people, and those without bush, this area is the only available forest resource. It is being rapidly depleted as trees are cut for firewood and other uses. A pilot for this work has been designed and will be executed by Professor Randy Thaman (USP Suva and PEP collaborator). Cyclone Kina struck Tongatapu in January 1993, extensively damaging this shore area. This problem is being studied, but no funds are available to undertake restorative work.

The second program is to provide seedlings for culturally and economically important trees and plants. Associated with this is an education program to heighten environmental awareness. Forestry extension officers work with the Education Department in bringing this program to the schools. Almost every primary school has a small planting, and schools and churches are requesting seedlings to be planted on their property. (Unfortunately, they use the exotic Pinus caribea for their school plantings). Four island nurseries have been established to provide the necessary seedlings of a variety of indigenous and exotic species. These seedlings are sold for an average seven sentisi each, substantially below their average cost of 45 sentisi. Faka'osi feels that it is the Government's responsibility to "commercialize" its nurseries, and to meet the country's total need for nursery stock. He does not see a role for private enterprise in this endeavor. He is lobbying the Government for additional funds to expand these programs, and indicated that a competing program would be neither desirable nor necessary.

Following this meeting with Faka'osi, we determined that it would be inappropriate for PEP and TCDT to intervene with a village-based nursery project. To do so would clearly conflict with a role Government has reserved for itself.

Saturday, 7 August 1993

Nora Devoe and I toured the eastern area of Tongatapu, observing extensive gardens of root crops, peppers, squash pumpkins, and other vegetables. Soils are deep and fertile, and fields are cropped year after year with little apparent need for observing fallow periods. The majority of garden plots are established beneath coconuts which are no longer maintained for copra production. Active removal of overstory coconuts is very much in evidence. Cultivators believe that full light boosts squash yields.

In the afternoon, we visited the site of the Brehm Fund's bird park, research station, and botanical garden on Tongatapu. The

Brehm Fund is a German NGO conducting a comprehensive program to save rare and endangered birds in the Pacific. Their work includes outer island surveys and establishment of new populations in the wild for the threatened species. At the bird park, walk-in cages with indigenous vegetation have been constructed to house native birds. Accompanied by a member of the park staff, we toured this attractive and impeccably maintained facility. The birds were healthy and the cages very well designed. Among the species being bred there are megapodes, red shinning parrots, blue-crowned Lorikeets, and friendly ground doves.

Sunday, 8 August 1993

Acting on the suggestion of Robert Gillett, Fisheries Adviser to the Ministry of Fisheries, we visited the Ha'atafu Beach Resort located on the northwestern tip of Tongatapu. This modest surfers' retreat is owned and operated by Stephen Burling, an Australian who has been in Tonga since 1979. Burling is married to a Tongan, and the resort is located on land belonging to his wife's family.

Burling employs 3 local men to fish for tuna, wahoo, mahimahi, and various species of whitefish. Fishing is carried on at a seamount located 2 miles from the resort. The catch is used to supply the resort's guests, with the excess being sold to hotels and restaurants in Nuku'alofa. Burling supplies the boat and motor. Proceeds of the daily catch, less expenses, are split 50/50 with the fishermen. A fisherman can earn up to T$250 per week.

Bob Gillett suggested that PEP work with Burling to establish a flyingfish fishery in addition to the existing operation. Gillett believes that in developing this currently unused resource, fishing pressure would be transferred from overexploited to under-fished species. Should this project prove successful, it should stimulate other fishermen to enter the flyingfish fishery. It is believed that flyingfish are found in abundance off the fringing reefs, 150 m from the shore. Both Gillett and Burling are confident that the Nuku'alofa market would absorb the flyingfish catch. In addition, flyingfish are the bait fish most preferred by sport fishermen, and they command high prices in this market. Flyingfish are caught on moonless nights. Fish are located using a high-powered light attached to a hard hat worn by the fisherman, and are netted with a large, long-handled dip net.

This concept was discussed with Burling, and he was enthused about the project. Although no commitments were made, it was informally agreed that if PEP would provide the specialized equipment required for flyingfish fishing, Burling would supply the boat and motor, supervise, and monitor the project. Bob Gillet would be asked to provide technical assistance as required. It was left that we would continue to investigate this project, and keep Burling informed of our progress.

Adjacent to Burling's property is an officially designated Marine Reserve, encompassing an area of fringing reef, lagoon, and the associated beach. Other than erecting a sign, the Government has made no effort to develop this area, or even to enforce regulations governing its use. Burling says that the local people are "totally contemptuous" of these regulations. The shoreline was seriously

eroded by cyclone Kina in January 1993, and markers designating reserve boundaries were destroyed. Burling is knowledgeable about this area, and interested in its preservation. We would like to explore options for linking the resort to reserve maintenance; Dr. Devoe will return to the site in October.

Monday, 9 August 1993

Nora Devoe and I met with Bob Gillett to further develop the flyingfish project. Gillett is well qualified, having been co-author of a FAO/UNDP publication entitled "Aspects of the Biology and Fisheries of Flyingfish in the Pacific Islands". Gillett offered to work with PEP and Steve Burling in providing technical assistance to a flyingfish project, pointing out that such an activity was within the purview of his job. Although minimal equipment is required to catch flyingfish, it can not be sourced in Tonga. Gillett suggested contacting Calvin Passfield, at the office of SPACHEE in Fiji, to help in acquiring the necessary gear.

In the afternoon following this meeting, I sought out sources of batteries, battery chargers, generators, and other equipment useful to the flyingfish project.

I met with Tavita Huakau of the Tonga Development Bank to review the Bank's lending policies as they relate to fishing projects. The Bank requires that the borrower's equity be equal to 25 - 50% of total project cost (depending upon the borrower's credit history), and that he/she have a co-signer. Both the borrower and co-signer are required to pledge assets to guarantee the loan. Interest is 10.5%, declining balance, with a 2 year payback (negotiable). A boat purchased under this scheme can be used only for fishing.

Nora Devoe and I had a meeting with Eric Powers, a PCV working in the Environmental Planning Office. As a secondary project, Powers works with a mens' group in Nuku'alofa. Through one of its members, this group has access to eight acres of land. As an income-generating project, they established a market garden on this plot, which was subsequently destroyed by pigs. Powers asked if PEP could assist with project, especially in providing money to fence the gardens. We discussed various ways in which PEP could intervene, as well as limitations imposed by the project. We suggested that Powers discuss the business side of this project with his group, and propose an enterprise development plan to us. Powers agreed to do so and to investigate the firewood market to provide the information necessary for a PEP business analysis. The project could serve as a demonstration plot, illustrating appropriate land use and encouraging fuel production. We believe this project has possibilities. An institutional "home" for the project to follow if beyond PEP's timeline would be needed to ensure that the relevant data would be collected and disseminated.

Tuesday, 10 August 1993

Nora Devoe and I flew to Vava'u, an island group lying 240 km northeast of Tongatapu. Our first meeting was with John H. Pello,

Civil Engineer, and William C. Wood, PCV, both with the EC's Vava'u Development Unit (VDU). Primarily concerned with civil engineering works, the VDU is involved in road construction, upgrading the Vava'a airfield, and construction of a quarantine facility. Bill Wood's focus is on the establishment of a national park on Mt. Taloa, a hill overlooking Vava'u's harbor and largest settlement, Neiafu. From our discussions with Pello and Wood, it was unclear which inputs to the park development would come from the VDU and which were expected from the government of Tonga. We wondered how the landholders with tenure on the lands surrounding the core of the park, and which are needed to make the park viable, would be persuaded to surrender their leases. These questions will be raised by correspondence. PEP may explore assisting with an alternative income-generating scheme for the landholders if other donors do not address this need.

We next visited the Forestry Division's nursery. Mark Probasco, a PCV assigned to the nursery, toured us through the facility. Seedlings are produced to support the primary school's environmental education program, and are supplied at no cost to local farmers. The nursery maintains a stall at the village market where a variety of plants and seedlings are offered at prices far below the cost of production. Probasco said that although business was brisk when the stall first opened, it has subsequently declined. This nursery has no problem in securing sufficient seeds to meet its requirements. At the suggestion of Bob Gillett, we met with Paul Mead, a former PCV and SPC master fisherman, now married to a Tongan and working with the PIMAR Project. With Mead, we discussed the possibility of extending the flyingfish fishing project to Vava'u. He was not encouraging, saying that the best fishing grounds were 30 to 40 miles from Neifau harbor. With a limited local market, especially for use as sport fishing bait, modest catch rates, and relatively distant location of the fishery, Mead opined that it would not be possible to develop a viable fishing enterprise. Mead informed us that the SPC piloted a flying fish project for Vava'u, Ha'apai and Tongatapu, using the Cook Islands method of fishing and gear. (Cook Islanders use on-ship generators to power their lights). Mead suggested that only in locations where flyingfish were plentiful and near-to-port should such a project be undertaken. Ha'atafu Beach is such a location; we were hoping to find another site to replicate the effort.

In the evening, we met with Denis Wolff, Koloa, Director of the Village Women's Development Program (VWDP) in Vava'u, and her husband, Lamane. The VWDP has a membership of 600 working in 59 groups. These women are interested in income-producing projects that will enable them to improve their homes. We discussed the PEP Project and possibility of joint PEP - VWDP efforts.

Wednesday, 11 August 1993

Koloa, Lamane, Koloni, Mele Tonga, Dennis Wolff, Nora Devoe, and I toured Vava'u to gain an understanding of local agricultural practices, and to further assess opportunities for PEP interventions. It is clear that Vava'u has an efficient marketing system giving it access to other Tongan markets as well as to export markets in Japan and New Zealand. Unlike Tongatapu, there is excess land in Vava'u, and producers can (and do) expand

production to meet the demands of these markets. Furthermore, as Nora pointed out, very profitable crops like squash and kava have little environmental value, while crops having great environmental value have limited commercial value. We concluded that there were no immediate PEP opportunities in Vava'u, but the left the door open to future suggestions.

Thursday, 12 August 1993

With William C. Wood of the EC's Vava'u Development Unit, Nora, Denis Wolff, and I toured the site of the proposed Taloa National Park. Sensitive to local customs, Wood is moving with deliberation in establishing this reserve. Success appears to hinge upon the Government's cooperation; this is not assured. Wood views the park as an ecotourism project, although it is difficult to imagine that it will become self-supporting. It will, however, be an additional tourist attraction, and as such should provide economic benefit to Vava'u's business community.

We returned to Tongatapu and Nuka'lofa in the afternoon.

Friday, 13 August 1993

Nora Devoe and I met with Princess Nanasipau'u, President of the Tongan women's association Langafonu'ua, who has demonstrated a strong interest in environment and women's affairs. The Princess believes that environmental awareness "must start with the women", and to that end has been active in promoting environmental awareness educational programs within Langafonu'ua.

We discussed the objectives and constraints of PEP, and our efforts to structure some sort of a community-based enterprise to grow and sell ornamental, cultural, and economic plants. The Princess was enthusiastic, mentioning the need in Tongatapu for specific varieties of pandanus and the "Pandanus Project".

When asked her opinion regarding the most important environmental problems in Tonga, she responded: 1) rubbish (litter, junk cars, and so forth), 2) fencing to control pigs, 3) need for environmental legislation, and 4) family planning, specifically, the need to involve men in family planning education. There followed a discussion of the pig problem (a frequently discussed issue wherever we went). The Princess says that although there is legislation in Nuku'alofa requiring pig control, the police are unable to enforce the law because it is difficult to determine who owns the offending animals. The Princess believes that a large-scale commercial piggery should be established to meet Tongatapu's porker requirements. I expressed the thought that as pigs now forage, and owners incur no expense in raising them, they are perceived as being free. Thus, it would be difficult to convince them to pay for commercially grown pigs - unless legislation prohibited free ranging pigs. The Princess said that such legislation would be very unpopular and unlikely to be enacted, although pig control legislation is pending.

No specific PEP related proposals came from our discussions with Princess Nanasipauiu; however, we assured her that we would be open to any future suggestions she might wish to make.

We next met with Semisi P. Taumoepeau, Director of Tourism. A 17-year veteran with the Bureau of Tourism, he was open and informative regarding tourism in Tonga. The draft of an ADB-financed Tourism Master Plan was recently delivered to the Government. Acceptance is delayed because the Government is evaluating the costs and benefits of a proposal for a World Heritage Area that would encompass much of the Ha'apai islands. Taumoepeau feels that the need for new, first class facilities is the biggest problem faced by his department. Although there are 600 rooms in Tonga, few are up to international standards. He sees the need for 200 new 4 - 5 star rooms. The country also lacks adequate convention facilities, and misses out on the convention business.

In the afternoon, we met with Dr. Dieter Rinke, Director of the Brehm Fund South Seas Expedition (this includes the bird park we visited on the previous Saturday). Rinke described the Brehm Fund's various programs in Tonga, including captive breeding, establishment of reserves, and translocation, or moving bird populations to more desirable locations. The study and translocation of an indigenous megapode has been a high priority.

It is the Brehm Fund's intention to turn the Bird Park over to the Government of Tonga in the next year or so; however, it does not appear that the Government will be able to provide sufficient funding to maintain the facility (approximately $30,000 per year). Rinke has trained a Tongan staff to operate the bird park, and the Brehm Fund will probably continue to provide funds for the near future. The long range outlook is clouded. It is clear that admission fees and gift sales will not produce enough revenue to allow the bird park to become self-sustaining. Rinke has in mind a scheme to generate substantial income from the bird park; this would be initiated some time in the future, and there is no obvious role for PEP.

Monday, 16 August 1993

I met with Kelvin Passfield, a fisheries biologist experienced in a flyingfish fishery. He was recommended by Gillet to assemble a "kit" for the proposed flyingfish project in Tonga. Equipment needed will include a long-handled dip net, halogen spotlight mounted on a hard hat, 100 amp, deep draw storage battery, battery charger device, and a battery condition indicator. He said the first net would probably have to come from Rarotonga; all other gear is available in Fiji.

We discussed the problem of charging batteries. Solar power, although attractive for many reasons, would require a high initial investment, say US$ 2500 (I will try to find less expensive sources for photovoltaics). A small gasoline powered portable generator is probably the most cost-effective approach for the relatively short term.

Passfield suggested that if we needed real expertise in flyingfish fishing technique, we should call on Sifa Fakafuka, a Master Fisherman employed by the government of the Cook Islands.

Passfield appears well qualified to undertake this work, and can start at any time.

Tuesday, 17 August 1993

Returned to Vanuatu.

# APPENDIX VIII

## ETHNOBOTANY AND CHANGING LAND USE IN NORTH AMBRYM, VANUATU

by

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and

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### 1 INTRODUCTION

This work was undertaken within the USAID-funded Profitable Environmental Protection (PEP) project, a regional integrated conservation and development project, and within a MacArthur Foundation grant to R. Thaman. PEP's purpose is to explore the linkages between private enterprise and biodiversity conservation, developing and disseminating examples of profitable enterprises that successfully safeguard priority biological resources.

A PEP site for conservation intervention, called an Ecological Management Unit or EMU, was selected on the north coast of the island of Ambrym, Republic of Vanuatu. This EMU, called Lolihor by its inhabitants, encompasses five main villages and five smaller ones, 750 people, and 4,400 hectares. Roads are absent. The terrain is finely dissected, narrow ridges and valleys generally steeply sloping down to the west-north-west and encompassing the several watersheds from the west slopes of Tovuo Vetlam (1170 m elevation) to the north edge of the Marum ash plain north to the sea. The area is valued for the remaining intact rainforest protecting the steep slopes above the limits of the present cultivation, the cloud forest above 800 m, and because it includes the northern access to the Marum and Benbow volcanoes and surrounding wildlands. Expansion of cultivation threatens the forest.

Forest loss is resulting from expansion of subsistence gardens, needed under present cultivation practices to feed the growing human population, and expansion of clean-cultivation cash-cropping of copra, cacao, peanuts, and kava, as well as small-holder cattle operations. As a crude measure of forest regression, Devoe compared garden locations visible on 1986 aerial photographs with an August, 1993 field reconnaissance that mapped existing gardens. New gardens are now interspersed

with forest at distances of 2.5 to 3.2 km from the coastal villages, while the new gardens in 1986 were from 1.7 to 2.3 km from the coastal villages.

Before the work reported here, it was thought that the Lolihor forest yielded no products traded for cash. The PEP project seeks to add to the value of the forest by marketing forest benefits heretofore unsold as a means of encouraging forest retention. PEP is also attempting to assist Lolihor residents to develop income sources that will provide alternatives to cash cropping and so reduce pressure on the remaining forest. Boosting production from areas already under cultivation is another forest conservation strategy under evaluation.

Retaining the forest is of social as well as conservation benefit. Biodiversity, or the variety and variability of plants and animals of any given place, is like a bank account from which people draw both their subsistence and cash incomes. Like any capital asset, the biota can be managed to maximize returns, both as income and as quality of life. McNeely et al. (1990) defined the elements of biodiversity that can be managed as "biological resources". Biodiversity, in the form of biological resources, is the material basis for life. As can be seen below, much of the plant biodiversity in North Ambrym is a biological resource from the point of view of the inhabitants. Part of the purpose of this study was to illustrate this point for the people themselves, with the information they provided, to demonstrate to them the many economic and culturally significant items they derive from the trees and forests surrounding them. Over the long term and on the large scale, the conservation of biodiversity is synonymous with the maximization of human welfare, because biodiversity (encompassing biological resources) is a prime source of human wealth and well-being.

## 2 METHODS

The PEP workplan includes a number of activities undertaken at each EMU. Among these is a community resource assessment, in which project staff facilitate the community's own assessment of its biological resources with regard to the presence and use of economic species and the degree to which resources are threatened. Thaman and associates joined this effort within a larger ethnobiological research program.

A 20-member team[1] including botanists, ecologists, community specialists, marine scientists examining aquatic resource use (not reported here), translators, and field guides assembled to collect the data. Four of the large villages within the EMU, two on the coast and two upslope, were selected as sampling points. Although the villages were not widely separated, culture dictates a partitioning of resources such that upslope villages have limited access to coastal resources. We sought to evaluate use of plants in all EMU ecosystems.

A questionnaire developed by Thaman was used with key informants. In each of the four villages, the man and the woman designated most knowledgeable about either marine or terrestrial

resources were interviewed (four informants per village). Others in the villages joined the discussions in less formal sessions and during the evenings while specimens were processed. For all categories of plants, informants were asked where the plants occurred, why they were important, what their uses were, what their status/availability was, whether there were management strategies related to their exploitation, frequency of use, and whether they had any commercial value or were ever sold. Varieties were tabulated for food crops. Among the categories of plants were:

the three most important freshwater plants,
the 20 most important wild tree species,
the 20 most important planted/cultivated tree species,
the 20 most important wild non-tree species,
the 20 most important planted/cultivated non-tree species,
the three most important non-vascular species,
the three most important species of fungi,
the three most important fern species,
the three most important wild grasses or sedges,
the three most important wild herbs,
the five most important staple food crops,
the five most important non-staple food crops,
the five most important tree food crops,
the ten most important medicinal plants,
the ten most important firewood plants,
the ten most important timber or construction plants,
the ten most important plants for garlands and perfumes,
the five most important plants for wood carving,
the five most important plants for weaving and basketry,
the five most important plants for obtaining dyes,
the five most important plants for improving soil,
the five most important spiritual or magic plants, and
the five most important plants for animal food.

Due to the primacy of women's roles in many resource management activities, and to structure PEP interventions to include women and promote their interests, gender dis-aggregated data was sought. We hoped, too, to assess any differences in women's and men's perceptions of plant resources and resource problems, and to gauge potential project impacts on both women and men. Many subsistence activities are restricted to one or the other gender, and sex roles are quite distinct in Ambrym. Accordingly, we had women interview women, and men interview men.

In cases where the respondent was quite knowledgeable, the key-informant approach worked well. However, the questionnaire was very lengthy, and asked many details unlikely to be known by one person. In some cases, groups of villagers assembled to respond, and these sessions generally produced much more information than those with single informants. However, the group format had drawbacks. It became difficult to keep women and men separated, and therefore some subjects could not be discussed. For example, medicinal plants with uses related to reproduction could not be discussed in mixed groups.

For much of the time, the botanists (Whistler, Vondonaivalu, Curry, Thaman) sought specimens of plants discussed by

informants and made general inventory collections over the area. While specimens were processed in the evenings, we retained our translators. The size of our group and the strangeness of our actvity attracted much attention. We took advantage of this to further discuss the specimens with the villagers. This expanded the list of names assigned to the specimens, and corroborated names and uses given by the key informants.

## 3 RESULTS

We prepared species lists with English, Bislama (pidgin), local language, and Latin names from the coastal, lowland, montane and cloud forests and from secondary forest, disturbed sites, villages, and gardens, including ethnobotanical information and whether the knowledge was attributed to women, men, or both. This information will be published in two forms, one suitable for use by rural communities, and one for ethnobotanists and other professionals. Because of the length of these lists, they are not appended here but can be obtained from either author.

Two sets of species were named in this exercise, one by the informants and one by the botanists inventorying the area. The informants listed by local names 341 species important for use; of these, 109 were not identified to scientific names by the botanists, leaving 232 species with local and Latin names, referred to as "the informants's list". The botanists listed and named 313 species, of which 123 had also been listed by the informants. Of the 109 scientifically identified species named by the informants but not the botanists, most were domesticated plants in gardens. A total of 422 species were identified with scientific names when lists of the informants and the botanists were combined. If we assume that the unidentified species were not among those identified, a total of 531 species were listed. This is not an exhaustive list of the EMU plant species. Fungi and bryophytes were not identified to species, nor were many orchids, and the botanical inventory was not an intensive sample.

The informants' list was composed of trees, 44%; herbs, 19%; vines, 16%; shrubs, 12%; ferns, 4%; grasses, 3.5%; and fungi 0.4%. Of the 232 scientifically named species listed by the informants, 43, or 18.%, were domesticated plants cultivated for food. These were trees (37%), herbs (30%), vines (18.6%), shrubs (9.3%), and grasses (4.7%). Wild germplasm is also cultivated for food, decoration, and many other uses, yet only 34% of the informants' list was labelled as ever planted or cultivated. That is, 66% of reportedly important plants are gathered from the wild with no management whatsoever.

Thirty-one percent of all species on the informants' list were described as "edible", 49% had a medicinal use, and 22% had a custom or spiritual use. In addition to the ordinary diverse uses such as umbrellas, toothpicks, hair dyes, pillow stuffing, and water filters, we found unusual ones such as "leaves used in magic to make wives run away" (Freycinetia sp.), "ash from wood mixed with feed to tame pigs" (Breynia disticha), "leaves used to exorcise ghosts of ancestors" (Piper methysticum), "leaves placed in fruit trees to repel flying foxes" (Euodia hortensis),

"plant used to calm the sea" (Flagellaria sp.), "custom computer for doing mathematics and sending messages" (Christella harveyi) and "leaves used medicinally to make infants start talking; used spiritually to help children talk" (Dischidia sp.).

Of the 232 species the informants listed, 70 were named by men but not by women while 56 were named by women but not by men. No division between the kinds of plants or uses named by males or females was obvious, except that plants listed as medicinal by women were more likely to treat women's and children's ailments than those listed as medicinal by men, and vice versa.

Informants were asked to tell where the species they named were found. Similarly, the botanists noted where species occurred and where from their larger experience they were known to occur. In both cases, it was occasionally unclear where a species might grow. When those with unclear occurrence were eliminated, the distribution of species diversity by habitat was:

| | Coastal | Low/Montane Forest | Cloud Forest | Disturbed Ruderal | Gardens Villages | Second. Forest |
|---|---|---|---|---|---|---|
| I | 31(09.4) | 56(17.0) | 1(00.3) | 51(15.5) | 124(37.7) | 63(19.0) |
| B | 62(15.3) | 137(33.9) | 49(12.0) | 98(24.3) | 18(04.5) | 40(09.9) |

where I indicates informants, B botanists, the first number species ocurrences, and in parenthesis, the percentage of all species occurrences in that habitat. There are more occurrences than species because many species occur in more than one habitat.

As can be seen from these data, people used plants close to their homes more than they used plants far away, with the most common habitat for useful species listed by informants (37.7%) as gardens and villages. This of course reflected the planting in gardens and villages of useful species originally from natural ecosystems. The bulk of the species diversity in the botanists' sample was in lowland and montane forest (33.9%). Some of the botanists' distribution was a sampling artifact reflecting the amount of time spent in a given habitat; they were less interested in the domesticated plants in gardens than they were in the natural diversity of forests.

The cloud forest is a steep climb from the nearest village and very small in area relative to coastal plant communities and other forest types. Of the 312 species tabulated by the botanists, 49 occurred in the cloud forest. While the relative species diversity in cloud forest was high, it was almost completely unused by villagers.

Of the 313 species identified by the botanists, they were able to categorize the origin of 196. One-hundred-fourteen of the 196 species were indigenous, while 52 were modern introductions, 19 were aboriginal introductions, and 11 were either indigenous or aboriginal introductions. Ten of the modern introductions were listed by the informants as useful plants, mostly for medicine.

The informants described serious supply problems for 24 of the 232 species on their list. Among the reasons stated for supply

problems were "failure to replant" (Bambusa vulgaris, Codiaem variegatum, Veitchia sp, Cordyline fruticosa, Nicotiana tabacum, Hibiscus manihot), susceptibility to sulfurous acid from volcanoes (Dracontomelon vitiense, Finschia chloroxantha), overuse (Alphitonia ziziphoides, Acacia spirobis, Burkella obovata, Planchonella grayana, Plectranthus scutellarioides), and what the botanists interpreted as natural rarity (Guettarda speciosa and several unidentified species). The most common reason given for short supply was "land clearing to make gardens" (Bambusa vulgaris, Bischofia javanica, Breynia disticha, Dysoxylum arborescens, Guettarda sp., Syzygium malaccense, Canarium indicum, Dioscorea nummularia, Ocimum basilicum, Ocimum sanctum, Zehneria sp., and many species without Latin names). Frequently when asked about supply, informants mentioned that a species was reasonably abundant but that a long walk was required to collect it.

We asked informants and villagers whether plants were ever sold. Among the plants sold were wild nuts (e.g., Barringtonia edulis, Canarium indicum), seasonally available wild and cultivated fruits and vegetables (e.g., Colocasia esculenta, Xanthosoma saggitifolium, Artocarpus altilis, Citrullus lanatus, Ipomea batatas, Dioscorea nummularia, Burkella obovata, Spondias dulcis, Citrus reticulata, Citrus sinensis), and cash crops (e.g., Piper methysticum, Arachis hypogaea, Cocos nucifera (copra and woven ware). Products made from plants that were frequently sold included medicines (e.g., Elattostema sp., Procris pedunculata, Hemigraphis alternata, Pisonia umbellifera), mats and baskets (Pandanus sp., Clinostigma sp.), skirts (Hibiscus tiliaceus), and carvings (e.g., Acacia spirobis, Artocarpus altilis, Casuarina equisetifolia, Cyathea sp., Guettarda speciosa, Pterocarpus indicus, Terminalia catappa, Thespesia populnea). While we had difficulty determining the amount of revenue generated, it was very clear that copra, cash crops, and carvings were extremely important to the village economy. Medicines were marketed among villagers, thus fetching lower prices than items sold in cities or to tourists, and therefore generating less though still significant revenue.

## 4 DISCUSSION

The numbers of rare species in the cloud forest and the overall diversity in the lower elevation forests were surprising given the very recent volcanic activity that created and enlarged Ambrym and the low diversity of Vanuatu's forests relative to those in Polynesia, Papua New Guinea, and Solomon Islands.

It was surprising that coastal plants were not more prominent in material culture, given the well-documented importance of coastal plant communities in the Pacific region (Thaman 1992). The botanists recognized twice as many coastal species as were mentioned as being important economic plants by informants. This may reflect the fact that many EMU residents migrated from Ambrym's interior toward the coasts, or were first generation descendents of migrants.

The range of uses found for plants in rural Pacific communities is very broad, as Table 1 (appended, previously tabulated by Thaman) illustrates. The Lolihor community attaches custom significance to almost a quarter of all economic species, with very particular cultural requirements for use. For example, the flowers of many species are used for decoration and dance costumes; often the informant would specify which segments of the community could use the species in question. North Ambrym traditional life is organized around a grade-taking hierarchy, with use privileges restricted to men above a specified grade. To illustrate further, certain Codiaeum variegatum cultivars are used as a personal signature of some chiefs, Pseuderanthemum whartonianum leaves are used to carry chief's food, and Pseuderanthemum bicolor is worn only by high chiefs to give scent. Such exacting use underlies a rich tradition and elaborate ritual.

More than a third of useful species are at least occasionally planted or tended in some way. Some species are widely cultivated because of their general utility. Bamboo is an example. The 1990 smallholder agricultural survey stated that 55% of Ambrym households planted bamboo in 1990, while 16% planted medicinal plants, primarily for treatment of fever (Rep. Vanuatu 1990). Useful species are most often found in proximity to villages, mainly because that is where they are planted or tended, but also because many are species occurring in secondary or disturbed plant communities. The botanists' sample included many more primary forest species than the informants' sample. Of the 190 species identified by the botanists but not the informants, 49 were from the cloud forest, which is rarely visited by villagers.

We were impressed with the level of botanical knowledge common in the EMU, and with the disparity between what was commonly known by elders and by youth. While the resource assessment highlighted environmental knowledge found in the EMU, mostly with elders, it also spotlighted areas of ignorance. For example, Devoe found in interviewing women noted for their knowledge of terrestrial resources that they could identify many economic species, detail preparations and customs related to use, describe species' habitats, characterize relative abundance, and comment on trends in supply. However, they exhibited very little awareness of the relationships and causalities among elements in the environment, such as the fact that the bourau tree (Hibiscus) is useful for increasing soil fertility because of its abundant litter production, or that megapodes are found in certain areas because the soil is the preferred temperature for incubation. The lack of awareness of ecological relationships is one impetus for the environmental education component within PEP. Unless these relationships are recognized, residents will not be effective conservationists.

Among the achievements of the resource assessment were consciousness-raising among an influential EMU cohort (chiefs and elders) and a small group of youths working intensively as translators and guides for the team. The resource supply data collected by the team will form the basis of the environmental education program for the EMU. Once data analysis is completed, assessment team members will return to the EMU to tell the

villagers what they told the assessment team about the status of their resources, especially which species or categories of species are in short supply (notably certain timbers, medicinal and custom plants). This discussion will serve to open questions about what strategies villagers have or might create to mitigate scarcity and conserve biodiversity.

## 5 CONCLUSIONS

Plant diversity in Lolihor is extremely important to the maintenance of tradition, with very particular species used for particular occasions by designated community members. Maybe because of the secrecy surrounding their use, custom, spiritual, and medicinal plants are less often cultivated than edible and more utilitarian species. This perhaps renders them more vulnerable to loss.

Informants said that more than 10% of plants identified as important to their economy and culture were scarce or becoming scarce, while many more were available but only at a considerable distance. A few of these species were probably always rare, but for most, supply problems are the result of land clearing for gardens. Plant biodiversity clearly underpins the cash and subsistence economies of Lolihor, and the decreasing availability of some species reflects the economic changes underway. Increasingly, land use is directed toward a cash economy. Unless ways are found to maintain existing plant communities while increasing access to cash, biodiversity will decline, resulting in the de-emphasis and eventual impoverishment of a rich cultural tradition.

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# APPENDIX IX

PROFITABLE ENVIRONMENT PROTECTION PROJECT

NATURE BASED TOURISM - NORTH AMBRYM

Short-term technical assistance contract to visit and identify the potential for low key nature based tourism in North Ambrym.

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## EXECUTIVE SUMMARY

An area in North Ambrym has been identified as an Ecological Management Unit (EMU) by the Profitable Environmental Protection Project managed by The Foundation for the Peoples of the South Pacific. Alternative land uses are being investigated to ease the pressure of increased gardening and cash cropping on the remaining scarce rainforest resource.

Tourism has been identified as a possible land use to generate extra income for the community within the EMU.

Existing visitors to the area are few in number, mainly people from passing yachts, with little revenue being currently generated by tourism. There is an existing guest house, but this has received very few visitors over the past three years due to lack of marketing.

Within the EMU, there are few areas likely to be of interest to visitors, however, the area is eminently suitable as a basis for low level ecotourism, adventure travel and cultural tourism, with a number of interesting features in the vicinity of the EMU.

The potential for tourism revolves around trekking, caving, environmental sightseeing and cultural interest.

It is felt that the reliance on passing yachts, even with better guides and promotion, will be unlikely to generate enough income to make further development worthwhile. A small tourism package attracting fly in-fly out tourists is necessary if tourism is to have a role to play in any form of profitable environmental protection.

With minimal input and little disturbance to the community, a small tourism package that can be marketed to attract up to 8 visitors at a time is feasible. With 5 such trips a year, this can result in about 1,000,000 vatu per year directly reaching the community.

Because of the lack of knowledge of tourism, a trial package is desirable, followed by a community workshop to decide whether to proceed further.

The success of such a tourism project will depend on specialized marketing and in the long term, a good experience for the visitor. In order to achieve this good experience, well trained guides are necessary.

The carrying capacity of the area is not high and therefore, visitor numbers should be kept relatively low, concentrating on a quality experience in a relatively unspoiled location. It is felt that any attempts at large scale tourism should be avoided for this reason. At this time, the resources of the area are not sufficient to attract any more than a half a dozen organized trips per year

## 1. INTRODUCTION

The investigation of the potential for nature based tourism on North Ambrym is part of a broader project, the Profitable Environmental Protection Project, funded by USAID through FSP. This project aims to investigate the feasibility of tourism to increase income within the defined Ecological Management Unit along with linking tourism to maintenance of forest cover.

This report looks at the potential for tourism within the area, assesses current and possible use and outlines the key components necessary if tourism is to contribute to the area. The report assesses the existing resources and outlines a possible procedure for developing tourism in the region.

The project was carried out by Vanuatu Agriculture and Resource Management Services consultant, Mr Jeremy Challacombe and funded by PEP.

## 2. METHODOLOGY

Preliminary discussions were held with the Field Staff of the PEP Project.

An initial survey was carried out in Vila to try to assess the current visitor use, especially by visiting yachts.

The area of North Ambrym was visited September 2-9, to inspect and identify possible tourist attractions. During this time, the concept of tourism was discussed with land owners and representatives from the relevant villages. The visit was facilitated by the PEP liaison Officer Mr. John Salong who assisted the consultant and accompanied him most of the time.

## 3. CURRENT AND POTENTIAL VISITOR USE

Definitive statistics relating to tourism arrivals and visitor use have not been collected. The Tourism Council of the South Pacific conducted a Vanuatu Visitor Survey in 1991. This report indicated that there were 39,784 arrivals during that year. These were only arrivals by air into the country and do not include cruise ship visitors or yachts. The report indicates that there were 17,115 tourist nights spent in the country, of which 1% were spent on islands other than Efate, Tanna, Santo and Malakula. This indicates that there were no more than 171 tourist nights spent on islands other than those enumerated, of which Ambrym was one.

Discussions with the owner of the guest house at Ranon indicated that there had been only about 10 guests during the last three years. Discussions with the village of Ranvetlam indicated a total of 40 visitors had trekked to the volcano in 1992, most of these were from passing yachts. It appears that the number of yachts passing the area is increasing, with 26 yachts anchoring off Ranon by mid-September, 1993. All yachts are supposed to clear port at Vila and indicate their intentions of landfall prior to leaving the

country, finally clearing at Santo, but the accuracy of numbers indicating they will be calling at North Ambrym is questionable.

During the field trip, a visit was made to the area by representatives of the cruise ship Club Med 2 who are proposing visits to North Ambrym commencing on the 25th of November.

There was a guest house at West Ambrym, Relais d'Ambrym, that catered to local and overseas visitors, but this closed in 1986 due to a custom land dispute. There were a number of visitors travelling and trekking to the volcanoes from this resort, but the figures are not available.

Until recently, the policy of the Vanuatu Government appeared to be to concentrate visitors to Efate, Tanna and Santo but, recently, there appears to be encouragement to spread visitors to other regions of the country. There is however, no official tourism plan for Vanuatu.

Given the interest by residents of Ambrym in restoring the Nasaras (traditional dancing ground) for tourism use, the increasing numbers of yachts passing the area and the interest by Club Med 2, it is felt that visitor use to the island as a whole, and to North Ambrym in particular, will increase. It is important that there should be some guidelines and management of tourism in the area in order to ensure that any tourism development and use is in line with the residents wishes and that environmental and cultural problems do not arise.

Future visitor use by yachts will likely increase, but other organised visits will be dictated to by airline seat availability to the island. Visitor use will also be affected by marketing and promotion. At present, the area is not well known to travel agents and tour operators, and there is little to no marketing of Ambrym as a tourist destination. Without promotion and marketing, it is unlikely that even well managed and organised visitor use will significantly increase.

## 4. ATTRACTIONS

### 4.1 Introduction

Within the boundaries of the EMU project there are limited attractions for visitors. There are, however, a number of attractions that are near the area and would make the potential for tourism more achievable. It is envisaged that any tourism operations would be based on the Ranon/Ranvetlam areas, thereby maximizing the benefits within the project area.

The Tourism Council of the South Pacific has identified the Ambrym Caldera as a proposed protected area with tourist potential; the details outlined in their publication "Guidelines for the Integration of Tourism Development and Environmental Protection in the South Pacific" published in 1990. It is felt that the rainforest of Tovua Vetlam could/should be incorporated in any such protected plan proposal as well.

## 4.2 Natural Attractions

### 4.2.1 Ambrym Caldera and Volcanoes

The two active volcanoes, Marum and Benbow, are probably the most interesting natural features on Ambrym from a tourist point of view. They are situated on the Western side of a massive caldera and ash plain of about 10km diameter. Access to the caldera and volcanoes is from the village of Ranvetlam following a ridge track rising from the coast to a height of about 700m, a distance of about 7km. During this walk, vegetation changes from overgrown coconut plantation to bush to forest, including tree fern forests. There are noticeable vegetation changes relating to altitude. Along the track there are a number of impressive scenic lookouts.

After 7km, there is a drop into the relatively flat caldera. Vegetation varies from low forest to grassland and eventually, to bare, eroded ash ridges. There are a number of recent lava flows which are ash covered and free of vegetation, making for relatively easy walking.

The prevailing wind blows volcanic smoke and ash in a Westerly direction, creating a desert like landscape with no vegetation at all.

The volcanoes are reached by another 5km trek from the Northern rim of the caldera and rise about 400m above the ash plain. They may be climbed to the edge of the crater with some difficulty.

### 4.2.2 Hot River, Buwoma

A hot river is situated on the coast about 7km West of Ranvetlam near Buwoma. The river runs out of a cave a short distance inland; the water temperature at the cave entrance is very high. There is significant algal growth along the full extent of the river. Even where the river enters the sea, the water is uncomfortably hot.

This area may be reached by boat from Ranvetlam or Ranon, the trip taking about a half an hour.

### 4.2.3 Lava Pipe Cave, Melvar

There is an extensive cave adjacent to the coast just above sea level near Melvar, about 4 km East of Ranon. This is accessible by boat. The cave is a basalt lava flow cave, and is sufficiently extensive to provide a two to three hour underground trek. Essentially, it is a recent basalt cave with some very small stalactites about 8 cm long formed by seepage through overlaying limestone.

The cave houses a large colony of bats thought to be Miniopterus sp, along with nesting sites of swiftlets.

Visitor use of the cave should be such that the bat colony is not significantly disturbed. It should be mapped and the colony sites identified so that they can be avoided.

### 4.2.4 Coastal Scenery, Ranvetlam to Ranon

The coastal scenery from Ranvetlam to Ranon is interesting and varied. At Ranvetlam, there is a steep rugged cliff foreshore and various fish species and turtles may be viewed from the cliff. This gradually becomes lower until it reaches a wide black sand beach finishing near Ranbwe. Another blacksand beach extends past Ranon and then the coastline rises quite steeply. The beach walk from Ranvetlam to Ranon is an easy walk of about 3 km in length.

4.2.5 Rainforest/Cloud Forest, Tovuo Vetlam

The slopes of Tovuo Vetlam consist of some relatively undisturbed rainforest, with the upper slopes containing small patches of cloud forest. The scenery, vegetation and birdlife is interesting and different to anywhere else on the island.

Access to Tovuo Vetlam is from Ranon or Fanrereo and is a climb of about 1100 metres.

4.3 Cultural Attractions

4.3.1 Fanla Village

Fanla village is situated at the Eastern end of the project area some 3 km from Ranon. It is an inland village situated on a high ridge extending North of Tovua.

The village is one of the few villages in the area that are still heavily involved in custom. Chief Tofor is a high custom chief and the Nasara or dancing ground is still used for custom ceremonies or Nimagis. There is a traditional nakamal surrounded by a variety of tamtams and black palm figures. The chief is prepared to perform traditional dances for visitors, but the area is also used for traditional ceremonies, some of which may be viewed by visitors.

4.3.2 George Mitchell Plantation, Ranon/Rambwe

Prior to independence, much of the area around Ranon was run by George Mitchell as a coconut plantation. Following independence, the land reverted back to custom ownership. The extent of the coconut plantation is still quite noticeable. The plantation buildings may be of interest to tourists, including the homestead and copra dryers.

4.3.3 Traditional houses, Nakamals and Village Life, Ranon

Ranon village itself is a typical village with traditional houses and a nakamal, or village meeting house, used frequently for meetings. The village is essentially a Presbyterian village with a church, stores and houses. There is a primary and junior secondary school. Life revolves around gardening, copra cutting, fishing and the production of handicrafts. There is a small guest house about 500m East of Ranon, situated on an attractive black sand beach.

4.4 Other Attractions

4.4.1 Handicrafts and Custom Stories

The North Ambrym area is home to some of the best carvers of traditional figures in the country. Individuals have special

rights to carve particular figures, and these are generally tamtams, black palm figures and stone carvings. Many of these are used for particular ceremonies, but a lot are carved for sale to tourists and are often sold through various outlets in Vila.

There are opportunities for visitors to inspect carvings, watch carvers at work, and purchase carvings. There is potential for explaining the meanings of different carvings to visitors.

There are also a number of custom stories that would be of interest to visitors and which could be told as part of a tourism programme.

### 4.4.2 Fishing and Canoe Trips

Because of the close proximity to the sea, there is potential to take visitors on fishing trips. There is also potential to offer visitors trips in traditional canoes.

## 5. FACILITIES

### 5.1 Accommodation

At the present time, there is only one two room guest house located near Ranon. Rossolo bungalow is owned by Solomon Merakon and has been built for tourists out of traditional materials.

Charges currently are 1000 vt/person including bed, linen and a kitchen. Food is provided at a cost of 300vt for breakfast, 600vt for lunch and 1000 vt dinner. The food is relatively basic and prepared at a nearby traditional kitchen. Solomon is in the process of building an additional four rooms with 2 beds each to accommodate more visitors. Unfortunately, there has been very limited visitor use over the last few years and often, the owner does not receive any money if the trip is booked through Vila. There are problems with marketing of the huts.

The accommodation is basic, but probably adequate for a specific type of tourist. The toilet is a pit toilet. With the expansion, two pit toilets, or preferably a basic septic system designed to suit Western standards would be desirable. The major disadvantage is the lack of water. All water is obtained from a nearby spring and bucketed to the site. It is essential that some form of water storage be constructed so that guests have access to tap water and basic showers.

Currently, the food costs are considered to be excessive. More use can be made of traditional foods rather than tinned fish and rice. There is opportunity for various groups to prepare traditional meals with better presentation.

There is no power or lighting, with the exception of kerosene lights. A solar power system would provide cheap lighting and could even provide for water pumping and refrigeration which would make the accommodation more acceptable.

Accommodation in bungalows is also available at Henyal-Orkon; these are not yet designated for use by tourists.

## 5.2 Transport

Transport to Ambrym is by plane from Port Vila either in a Vanair Islander or Twin Otter, with three return flights per week. The return fare from Vila is 11.000 vatu. The airport at Craig Cove is about one hours flying time from Vila and is situated about 15km West of Ranon.

Access to Ranon and Ranvetlam is by speedboat from Craig Cove. The journey varies from one and a half to two and a half hours depending on the size of the boat. The fare is 8000 vatu one way. The standard of boats vary and the sea trip is relatively safe for most of the year.

There is no land transport within the North Ambrym region and any trips must be made on foot or by hiring a small boat and traveling by sea.

## 5.3 Other Infrastructure (Health, Safety, Telephone, Shopping)

The North Ambrym area is isolated with very limited facilities. There are anopheles mosquitoes in the area and visitors should take precautions against malaria. Scratches and cuts can become infected in a short time, so care should be taken by visitors. There is an aid post at Ranon, but medical facilities are limited. Visitors to the area should be aware of this, and should be fit and healthy as removal to a hospital is difficult and expensive.

The whole area is quite safe for travel, although the need for common courtesies prevail. Permission should always be sought before wandering around. Any walks should be accompanied by a guide who would arrange the necessary permission.

There is a telephone at Henyal-Orkon giving access to Vila and overseas.

There are coop stores and private stores in most villages, but their goods are very limited. If tourism is to increase, some stores could stock those items that may be used by tourists. If not, visitors would be advised to bring any extra requirements they may need.

# 6. TOURISM OPTIONS

## 6.1 Do Nothing

The most basic option is to continue as at present. There are a small number of tourists that visit the area; most of them arrive and sleep on their yachts. Some buy souvenirs, some visit the volcano and view custom dances. The guest house gets occasional visitors and the disruption to the community is minimal.

Unfortunately, because of the lack of infrastructure and little marketing, the amount of benefits that tourism currently brings to the area is thought to be minimal. It would be unlikely that the existing set-up would in any way contribute to assisting in environmental conservation. Visitor use is haphazard, little money

comes to the area and it is not distributed throughout the community.

## 6.2 Yachts and Sea Travelers

The most simple way to increase visitor use with little cost to the community is to offer more to passing yachts. The numbers of yachts visiting the area appears to be increasing, and if there were more organised activities, these could be offered to these visitors. Promotion could be done through international yachting magazines and the Vanuatu Cruising Yacht Club. As the yacht community is small and close knit, if the destination is popular, promotion will be done by word of mouth.

With little organization, trips can be planned to the sites outlined above, guides trained to take trips, traditional dances organised. This could obviously employ more of the community in tourism and distribute the benefits gained more widely in the region.

The disadvantage is that yacht visits are irregular and may coincide with times that are not suitable to the residents. Numbers are variable so that guides may be employed to take one person on a trip, then nothing for a few days and then maybe a few more.

Whilst the disruption to the community is minimized because sleeping and eating facilities are not necessary, the amount of money deposited in relation to the effort involved is likely to be minimal. Often people on yachts have a minimal budget and therefore, unless numbers significantly increase, there is little incentive for the community to provide anything more than currently exists.

## 6.3 Organised Adventure Travel and Cultural Trips

The whole area lends itself to soft adventure, a unique experience including nature study and programs of cultural interest. Without any promotion and market development, benefits that could be obtained from tourism are likely to be minimal. It is a difficult area to reach and is relatively unknown. In order to bring even modest tourism revenue to the region on a regular basis, marketing and promotion are necessary. With minimal inputs, a small regular captive group of tourists could visit the area with little disruption to the community. Tourists could fly to Craig Cove, boat to Ranon and use the Ranon guest house for central accommodation. Natural and cultural attractions are within relatively easy day walking distance from Ranon and there are enough activities to occupy visitors for about three days. Tourists could then trek to the ash plain, explore and camp overnight and then walk to Emiotungan and be transported back to the airport by truck, or they could walk all the way to Craig Cove.

Such trips could be organised about four or six times per year catering for small numbers of tourists per trip. The number is likely to be dictated to by plane seats and is likely to be no more than eight per trip.

This will still allow for tourist use of the area by visiting yachts but is felt to be of minimal impact to the community. It allows for a regular inflow of tourist funds to the district through guide fees, entry fees to sites and dances, accommodation, transport within the area, food, purchase of handicrafts, and perhaps purchase of goods from stores.

A draft outline of possible activities and timetable, along with possible costings is shown in Appendix 3

6.4 Large Scale Tourism

Whilst tourism on a larger scale may provide more money to the region, it is also likely to be more costly and beyond the current management capabilities of the area. As numbers increase, so the carrying capacity both environmentally and culturally, will be adversely affected resulting in a lesser experience.

Residents within the area are not familiar with tourism. It is a recent form of land use and experience has shown that it is better to start any tourism projects on a low key basis, at the same time ensuring that the maximum benefits remain in the region. Whilst larger scale tourism brings more wealth, it is often controlled from outside and results in significant cultural change and community disruption.

As residents become more familiar with the concept of tourism they may decide to try to increase numbers of visitors at some stage in the future.

The other major disadvantage to any large scale ventures is that the area does not lend itself to them. Whilst the natural resources and cultural attractions of the area are very special, they are limited and would compete with other attractions both within the country and other countries. Therefore it is felt that any large scale tourism is not appropriate at this time.

6.5 Costs and benefits of tourism

The aim of the Profitable Environment Protection Project is essentially to provide financial incentives in order to reduce pressure on the existing areas of natural forest that are gradually being cleared for gardens and cash cropping. It is felt that tourism can play a small part in this, but will not be the answer by itself. It is difficult to ensure that the benefits of tourism go to those land owners that may be using the forest. It is important to ensure that the distribution of benefits reaches the whole community.

The costs of tourism relate to in increased expenditure on goods that are necessary for a tourism infrastructure, disruption of a normal traditional life pattern, adverse affects on traditional life styles and custom. These costs can all be minimized through careful management.

Benefits likely to accrue are a greater inflow of wealth and circulation of wealth within the area, increased employment opportunities thus reducing urban drift and a desire to preserve both environment and culture as it now has perceived monetary

value. It is estimated that if it were possible to organise five trips of eight persons per year, this could result in an annual injection of 1,000,000 vatu into the region. (This figure represents the amount to be paid by each tourist less air fare [VT 25.000], times 8 tourists per group, times 5 groups per year. See appendix 3 for details.) Additional income would come from handicraft sales and money derived from other visitors.

## 7. INTERPRETATION AND GUIDE TRAINING

One of the key factors in the success of any ecotourism venture is good interpretation and effective guides. All visitors to the area should be accompanied by guides for a number of reasons:

Guides should be paid and therefore a guide system creates employment and retains money in the area.

Guides are essential to ensure that tourists to not wander unchecked throughout custom land.

Guides are necessary for the safety of tourists.

Guides act as interpretive persons, thus enhancing the visitor experience.

Ideally, guides should be recruited from the area and should be familiar with English and perhaps French. There is likely to be a limitation in the early days of development of such a project as there are very few people in the area who feel comfortable in a language other than their own or Bislama. At the early stage, it may be necessary to have an interpreter with every tourist group who acts as a link between the guide and the visitors and who can also help to develop confidence in the guide.

Guides should be selected from among those who are interested and comfortable with visitors. Some preliminary form of training is required. Essentially, guides should understand tourist expectations and be able to interpret natural features or custom features in a manner that is interesting and informative to visitors. Basic training should be given in first aid.

Ideally, there should be a guide for each group of four tourists, with a pool of guides so that there are always some available. At the outset, a number persons should be identified as potential guides and some basic training given on interpretation, visitor expectations and human behaviour, communication, natural history of the area, and telling custom stories. Guides should be accompanied on trips by someone who can sit down with them after and discuss the trip. These guides should be evaluated over time. Eventually, there will be a number who are no longer interested and a small group of committed guides will develop. Once they have taken a number of groups through, it would be ideal if funds were available, to select a small number to spend some time in a park or ecotourism project overseas. New Zealand probably excels in outdoor recreation and ecotourism and the experience gained by spending some time at a place like Waitomo and Ruapehu would outweigh any formal training they could receive in Vanuatu. There

they would be exposed to many visitors from all walks of life and watch how these visitors are managed.

Guides should also be trained in basic observation and be encouraged to keep records. Essentially, they would act in a similar fashion as park wardens and could be used to monitor environmental changes, wildlife movements and the like. They will also be able to identify optimal carrying capacities and know when environmental thresholds are being reached.

Ideally, in time, guides should be registered so that a basic standard for visitors is maintained. If there were other areas in the country that were involved in similar projects, it would warrant the running of courses for people throughout the country.

## 8. MARKETING

The key component to any tourism venture, irrespective of type or size, is marketing. Tourists have a wide variety of activities and destinations to choose from. The existing bungalow at Ranon is a good example. It has been there for a number of years and yet use is extremely low as a direct result of lack of marketing.

There is definitely potential for low level adventure ecotourism development in North Ambrym, but it is likely to attract a special kind of tourist. The Vanuatu tourism sector essentially caters for relaxing holidays in relatively comfortable hotels in a pleasant environment. Many of these tourists will take a day trip to Tanna to look at the volcano but with little exertion. There may be a small number who would travel as part of their trip to Ambrym, but are probably in the minority.

There is a very specialized market in adventure tourism and ecotourism and it is targeted to specific kinds of tourists. There are a number of people who are not looking for nice hotels and a sandy beach. They are looking to go somewhere different and experience something that they cannot find at home. They are also looking for some kind of adventure with the feeling of a bit of risk. They still have basic comfort needs but the quality of the holiday lies in the cultural experience, the uniqueness and the value for money they receive through interpretation.

At this stage, there are no experienced marketers of this kind of holiday in Vanuatu. Perhaps some of the diving or sailing holidays are similar, but they attract a different kind of tourist.

It is felt that the bulk of the tourists in the first instance will come from Australia and to a lesser extent, New Zealand. Australians are going through an adventure travel/ecotourism boom at present and a number of companies cater exclusively to such people. Once the product has been trialled, it is felt that contact should be made with companies such as Wilderness Expeditions, Scobies Walkabout Tours, Australian Himalayan Expeditions etc. There are publications such as "Wild", "Geo", "Australian Natural History" that regularly advertise such companies and run articles on interesting trips. Many of these companies are offering trips in Papua New Guinea, trekking and

rafting in Fiji, and are looking for new places and experiences to offer.

It is felt that in the absence of anyone in Vanuatu in this field, such companies should be lobbied to assess their interest. The key factor, if they are interested, is to ensure that the local community gets a fair share of the profit. It must, however, be recognized that the company also has to make a profit. The company should also be advised by the community to ensure that overuse does not occur and that increased use is a result of community acceptance rather than company pressure.

## 9. RECOMMENDATIONS

9.1 A recognition that there is potential for small scale tourism that could be developed in the area. This will not just happen, and needs to be organised, planned and marketed. It is unlikely that a dependence on the yacht traffic will satisfy local expectations.

9.2 Any initial tourism development should be extremely low key and accompanied by an extension and communication programme so that local expectations are not unrealistically high.

9.3 Full discussions should be held with the community, and those individuals likely to be involved, prior to any trial venture.

9.4 A pilot excursion be organized consisting of 8 fully paying people from Vila that would be typical of the kind of tourist that would be expected if a programme were marketed overseas.

9.5 Following completion of this exercise, a community workshop be arranged to discuss the experience, any shortcomings, and decide whether to proceed or stop.

9.6 A follow up of the visitors to assess their views.

9.7 If there is long term potential, then an overseas adventure travel or ecotourism agent be approached to package and market the trip, ensuring that benefits are equitably apportioned and the in country component is retained in North Ambrym.

9.8 Through the PEP Liaison Officer, a number of guides be identified and a preliminary training programme be organised.

9.9 Discussions be held with the guest house proprietors at Ranon regarding water supply and toilet facilities, and advice be given to them on necessary improvements.

## 10. CONCLUSION

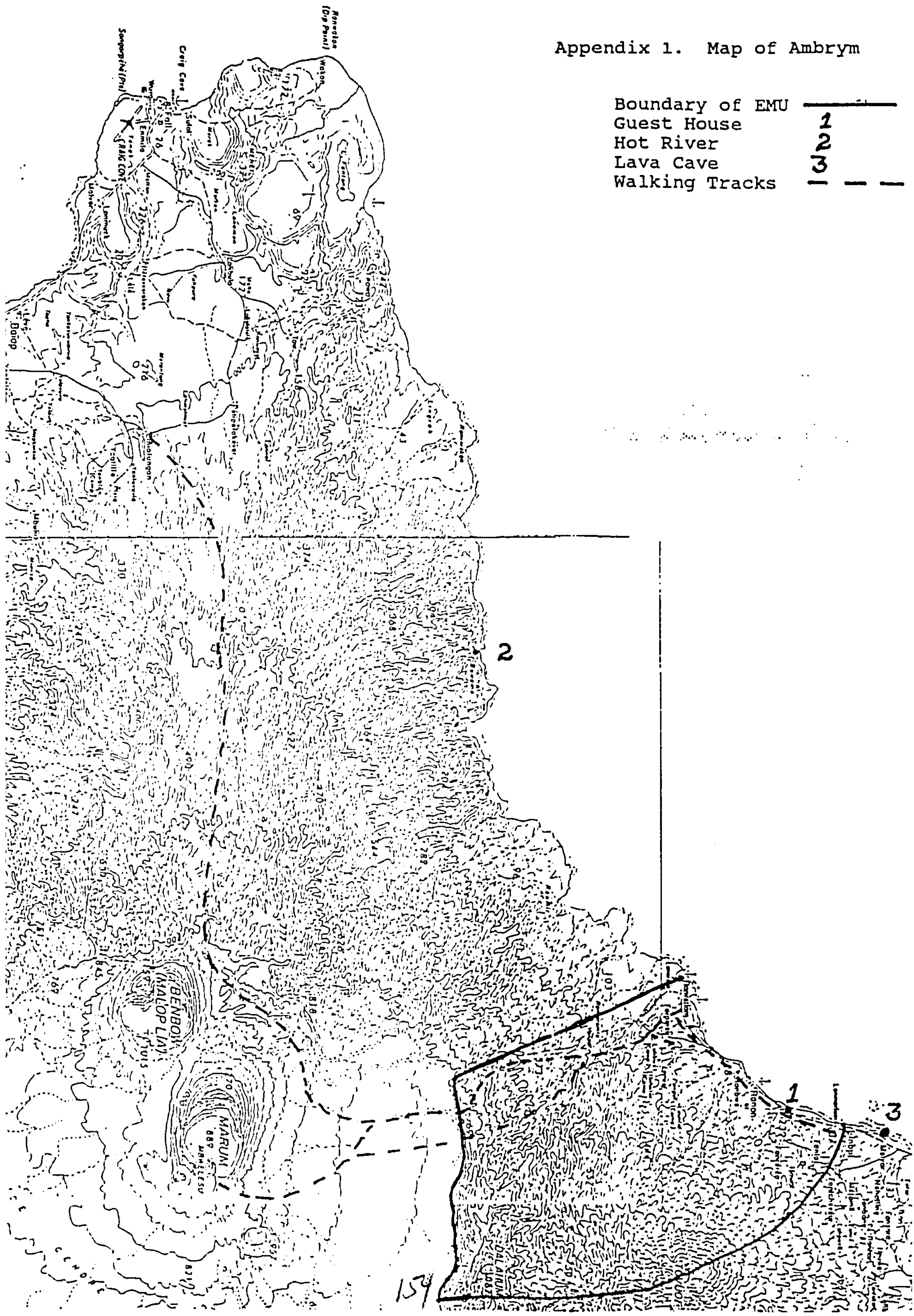
The North Ambrym area outlined in the Profitable Environment Protection Project is felt to have potential for low level tourism based on soft adventure and environmental and cultural interest. Because of the lack of facilities and the lack of knowledge of tourism, any developments should be of a moderate scale, and there

should be an on going programme of community awareness and feedback.

In order to substantially increase income within the EMU, it is felt that the target tourist market should be broader than just passing yachts. In order to be successful, resident expectations should be realistic and the product will need to be carefully marketed.

With appropriate marketing, assistance with development of guide training and slight improvements in local facilities, it should be possible to obtain a small regular steady inflow of visitors as well as accommodate any other travelers if acceptable.

Appendix 1. Map of Ambrym



## Appendix 2. Consultants Itinerary and People Visited

This project was made possible through the PEP Project, and thanks go to PEP staff for all of their assistance. Acknowledgement is also made to the people of the Lolihor area of North Ambrym for their assistance, especially to the PEP Project Liaison Officer, Mr. John Salong and his family who made the visit successful.

2/9/93 Fly Vila - Craig Cove. Boat to Ranon. Meeting with Chief of Ranon. Meeting with Solomon Merakon and family. Visit handicraft outlet. Stay at Rossolo bungalow, Ranon.

3/9/93 Discussion of project at Ranon. Meeting with Billy Bong, Cultural Centre field worker, Ranon. Discuss programme with John Salong. Visit hot river. Return to Ranvetlam. Sleep at Henyal-Orkon.

4/9/93 Walk to caldera and climb Marum volcano from Ranvetlam.

5/9/93 Discussion with John Salong regarding project. Look at Ranvetlam coast. Visit Fanla village and discussion with Chief Tofor.

6/9/93 Meeting with villages of Ranvetlam and Faramsu. Travel to Nopul to attend meeting of district chiefs regarding tourism. Meeting with Ranon and discussion of project.

7/9/93 Visit cave at Melvar and meeting with Daniel Bangtor, custom owner. Visit plantation site at Ranon.

8/9/93 Walk to caldera and camp near Benbow.

9/9/93 Walk from volcano to Baiap and then to Craig Cove. Fly to Vila.

## Appendix 3. Suggested Costings and Itinerary For a Trial Tour

Rationale:

In order to assess the feasibility for a small tourism package, it is suggested that a trial run be carried out using visitors from Vila. Eight people should be identified who would be similar to the type of tourist to be targeted. They should be approached to see if they would be prepared to pay for a package trip to Ambrym. The cost should be all inclusive and should be collected and distributed to the region. Following the visit, a small workshop should be held in the area to evaluate the trial. At the same time, the visitors should be surveyed to get feedback on their feelings about the trip.

Suggested Itinerary:

Thursday - Depart Port Vila at 1120, arrive at Craig Cove at 1300. Depart for Ranon by boat at 1400, arrive at Ranon at 1530. Settle in at Solomon Merakons guest house. Evening meal at guest house along with an introduction to the area, its history, custom, etc.

Friday - Morning, walk to Fanla, watch a custom dance and a brief look at the village. Return to Ranon via Fanrereo. Afternoon, look around Ranon and visit the old homestead and copra dryer. During this day, an informative interpretive walk outlining traditional village life in Fanla and Ranon, and talk about the plantation era and its significance. Evening meal at guest house.

Saturday - Coastal exploration by boat. Morning, visit the cave and explore. Discussion on fauna, geology and custom significance of the cave. Depart by boat to Hot River. Explore, swim, lunch on food cooked in the hot water. Evening meal at guest house.

Sunday - Morning free. For those who wish, attend church with the village. Afternoon, walk along the coast to Ranvetlam, look at handicrafts. Perhaps a talk on traditional food and handicraft production. Evening meal with village if possible.

Monday - Early morning, walk to ash plain via Ranvetlam or Faramsu. Explore the plain and climb the volcanoes. Camp in the caldera between Benbow and Marum. (If necessary, any gear can be returned to Craig Cove by boat so the minimum needs to be carried on the trek)

Tuesday - Leave camp early in the morning and walk to the village of Emiotungan. Truck transport from here to Craig Cove. (If not, walk to Craig Cove). Depart from Craig Cove at 1330, arrive at Vila at 1430.

Suggested Cost.

The cost to the tourists should be an inclusive package, Vila - Ambrym - Vila, and should cover transport, accommodation, meals, guides and entry fees.

Visitors should bring additional money for purchase of handicrafts and souvenirs, and for purchase of snacks and drinks at coop stores.

The cost is based on 8 visitors and assumes one guide to 4 visitors. The suggested package price is 36,000 vatu per person based as follows:

| Details | Cost/person |
|---|---|
| Air fare. Vila - Craig Cove - Vila | 11,000 Vt |
| Boat. Craig Cove - Ranon and return with gear (8000 Vt per trip) | 2,000 Vt |
| Accommodation. 4 nights at Ranon, One night camping at 1000 Vt per night. | 5,000 Vt |
| Meals. 1000 Vt per day for 5 days. | 5,000 Vt |
| Visit to Fanla and fee for dance. (20000 Vt per group) | 2,500 Vt |
| Guide to Fanla. | 500 Vt |
| Entry to cave and hot river. | 1,000 Vt |
| Guide to cave and hot river. | 500 Vt |
| Boat hire for cave and hot river. (8000 Vt per trip) | 1,000 Vt |
| Viewing fee for volcano. | 1,000 Vt |
| Guide for volcano and walk to Craig Cove. | 1,000 Vt |
| Truck hire to Craig Cove | 500 Vt |
| Community fund for further development | 5,000 Vt |
| Total inclusive cost | 36,000 Vt |

## Appendix 4. Photographs

1. Ranvetlam village
2. Store and office, Henyal-Orkon
3. Accommodation, Henyal-Orkon
4. Copra dryer, ex George Mitchell plantation, Ranon
5. Homestead and Namele, ex George Mitchell plantation, Ranon
6. Rossolo bungalow, Solomon Merakon rest house, Ranon
7. New guest house, Solomon Merakon, Ranon
8. Guest house and kitchen, Solomon Merakon, Ranon
9. Kitchen, Solomon Merakon, Ranon
10. Guest house complex, Solomon Merakon, Ranon
11. Ranon village, ex George Mitchell plantation, Mt Tovuo Vetlam
12. Nakamal, Ranon village
13. Nakamal, Ranon village
14. Bay at Ranon looking West
15. Cruising yacht moored off Ranon
16. Tamtam, Ranon
17. Shark jaws, Henyal-Orkon
18. Shark jaw, Henyal-Orkon
19. Hot river near Buwoma
20. Hot river near Buwoma
21. Hot river and cave, near Buwoma
22. Coastline near Melvar
23. Cave at Melvar
24. Cave at Melvar
25. Walking track from Ranvetlam to caldera
26. Walking track from Ranvetlam to caldera
27. View from walking track looking East towards Fanla
28. Tree fern (black palm) forest on Northern slope of Caldera
29. Club moss on recent ash fall, caldera near Marum
30. Orchid, Dendrobium sp., in caldera
31. Recent lava flow at northern lip of caldera
32. Recent lava flow near edge of caldera
33. Gully towards Marum
34. View from edge of Marum looking North
35. View from edge of Marum looking North
36. Rim of crater, Marum
37. Crater rim, Marum, John Salong
38. Benbow
39. Marum, mist and volcanic smoke
40. Ash ridges looking West.
41. Lava flow, caldera looking towards Tovuo Vetlam
42. Lava flow, caldera
43. End of lava flow, caldera
44. Benbow shrouded in mist and smoke
45. Eroded volcanic ash terrain near Benbow
46. Recent lava flow near Benbow
47. Recent lava flow near Benbow
48. Recent lava flow looking towards Benbow
49. Campsite/accommodation near Benbow
50. Ash ridges from Benbow looking Southwest
51. View from Benbow towards Craig Cove
52. Landscape looking West from Benbow
53. Walking track from Caldera to West
54. John Salong on ash ridge
55. Walking track to the West along ash ridge

## Appendix 5. Initial Environmental Examination

### 1. Introduction.

To conform with USAID requirements, an Initial Environmental Examination (IEE) is required to identify any impacts of development of a nature based tourism project. On the basis of this, a decision can be made as to the necessity for the preparation of an Environmental Impact Statement.

This environmental examination looks at the existing environment, the size and impact of the proposed project, and identifies possible environmental impacts and benefits along with discussion as to their significance.

### 2. Existing Environment

Within the EMU, there are a few areas of relatively undisturbed forest. These occur on the upper slopes of Tovuo Vetlam, Dalahum, and the upper sections of ridges and valleys running North from the caldera. Gardens are encroaching on many of these areas, and in some areas, small numbers of cattle freely roam, their impact being noticeable.

The lower slopes to the coast have been planted to coconuts, managed as a plantation up until 1980. Since then, nuts are harvested, but the coconuts are not managed and are becoming overgrown. There were no noticeable new plantings of coconuts in the area.

Most villages are located along the coast or on higher slopes in the coastal hinterland. The coast itself consists of rocky cliffs at the East and West extremities with a large stretch of blacksand beach in between. Coastal vegetation has been disturbed over the past hundred years and consists of Acacia spirobolus woodland interspersed with Casuarina sp.

Water is scarce, with the area undergoing periodic droughts. There are no permanent running streams. Water is obtained by wells or by freshwater soaks along the coast. Water quality is unknown. The potential for pollution through human waste disposal is considered to be high in the vicinity of villages, most toilets being simple pit toilets. Safe drinking water is obtained from rainwater runoff in some areas.

The numbers and distribution of birds, animals and plants is not well known.

Current land uses include gardening and cash cropping, some livestock grazing and harvesting of black palm and various tree species for carvings. Bush areas are used for pig hunting with a number of wild pigs in the area.

### 3. Current Tourism Impact

Given the extremely low numbers of visitors to the area, the environmental impact of tourism is considered minimal to non existent. Most visitors to the area stay on board yachts and generate very little waste. The tracks along the coast and to the

caldera are generally not heavily eroded and the additional impact of prospective tourist numbers would have a negligible impact.

4. Proposed Tourism Development

It is envisaged that there is potential for developing tourism to a greater extent than current use. Given the limited attractions of the area, limitations on transport and accommodation, and the unfamiliarity by the residents of tourism as a land use, recommended development will be very low key.

There are probably less than 100 tourists visiting the area currently each year. Many of these are on yachts and place little demand on the natural resources of the area. The proposal is to fly in tourists in small groups of a maximum of 8 persons at a time for five days no more than 6 times per year will result in an increase of about another 50 persons per year. If the destination becomes reasonably well known, it may be possible for up to 50 residents from Vila visit the area per year. This indicates a maximum of about 200 visitors per year.

The emphasis on the proposed development is to maximize the tourism experience, manage the tourists, and retain the maximum income within the region. There will be a small throughput of tourists thus minimizing disruption to the community.

5. Impacts of Proposed Tourism Development

Tourism development will revolve around natural and cultural attractions, thus enhancing the need for responsible management of the natural resources of the area. Any negative environmental impacts are likely to result in a reduction of tourism appeal, and therefore lead to a loss of income. Because of the low levels of numbers proposed, the impacts are considered to be minimal, provided tourism is managed and effects continually monitored.

Likely impacts relate to waste disposal, water needs, erosion and habitat disturbance. These possible impacts are discussed below:

A. Waste disposal - Given the low numbers, there should be little generation of solid waste. A fly proof waste pit should be constructed near the guest house at Ranon. Any rubbish generated while trekking should be carried back to a disposal site.

   Suitably located pit toilets are acceptable for the guest house although a septic tank would be more desirable. Because of the scarcity of water, salt water flush toilets could be considered.

   Suitably located pit toilets can be constructed at camping sites on the caldera. With an envisaged number of about 200 visitors per year, the pollution potential is minimal.

B. Water needs - Clean, reliable fresh water is scarce and an extra 200 persons per year will make a demand on existing supplies. If possible, rainwater should be collected in a tank for drinking. Washing water can be obtained by tapping

into the freshwater spring near the guest house at Ranon. This will be of positive benefit to the Ranon community.

C. Erosion - The walking tracks between the villages are relatively stable, although there are signs of erosion around Fanla. The track from Ranvetlam to the caldera is well used, but quite stable. With the proposed low level of usage, track erosion should not be significant. The trail will not be continually used and is relatively stable.

D. Habitat disturbance - The numbers of visitors to the area at any one time are unlikely to have an adverse impact on the flora and fauna of the area. Tourists will be well controlled as they will require guides at all times.

The one area of possible impact is disturbance to the bat colony at the cave site at Melvar. It is proposed that prior to regular use, the cave be mapped and bat roosting sites identified. Visitors to the cave should be under the control of the guides at all times.

6. Comments on Environmental Costs and Benefits

The rationale for developing tourism in the area is to allow for an increase of money that could assist in ensuring that the remaining forest areas could be left relatively undisturbed. Given the proposed low levels of visitors, the environmental impacts are likely to be minimal, and yet a small but significant amount of income can be generated. Providing the residents are aware of the link between the need for an unspoiled environment and environment based tourism, there is little likelihood of adverse impacts occurring.

The major benefits relate to increased income and retention of people within the community as a result of greater employment in the form of guides, and in providing accommodations and catering. With environmentally based tourism, an awareness of the value of an undisturbed environment is heightened within the community as the natural resources of the area are seen to have a monetary value. The community therefore becomes more environmentally responsible and future land use options are retained.

7. Conclusion

Given that tourism will depend on a well managed environment, and that the proposed numbers are low, it is felt that an Environmental Impact Assessment is not warranted at this time.

# APPENDIX X

The Profitable Environmental Protection Project:
Will Conservation Pay Its Own Way?

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Abstract

The purpose of the Profitable Environmental Protection Project is to develop and disseminate examples of profitable enterprises that safeguard priority biological resources. The project provides technical assistance to design or modify appropriate enterprises to maximize conservation benefit and to support the pursuit of such enterprises in rural communities. Services to businesses include help with planning, access to credit/capital, marketing, training, and seed money. Social support includes community organizing, environmental education, participatory planning and management, monitoring and evaluation. The profit from the enterprises, and the enterprises themselves, provide motivation for and finance conservation activities.

## 1.1 Introduction

The Profitable Environmental Protection (PEP) Project is an integrated conservation and development project that began field operations in September, 1992. Its purpose is to explore the linkages between private enterprise and conservation of biological systems, developing and disseminating examples of profitable enterprises that successfully safeguard priority biological resources. The funding mechanism involved is the same as the primary reason the enterprises are undertaken: profit. Our intention is to demonstrate that enterprises that are ecologically beneficial, or at least benign and sustainable, can be profitable, and that development can be integrated with nature conservation. If it is profitable, and competitive with returns from other

activities, the enterprise itself will provide sufficient motivation to sustain the conservation activity, or to preclude profit-destroying, destructive activities.

## 1.2 Discussion of Key Concepts

### 1.2.1 Priority Biological Resources

PEP is funded by the United States Agency for International Development (USAID) and is part of the US contribution to the Global Environment Facility (GEF). As such, priority biological resources for PEP are ecosystems that are exceptionally diverse, or that include endangered, threatened, or rare species, critical habitat for such species, or a high proportion of endemic species. Biodiversity as such is not recognized as a priority by rural Pacific Islanders--developed-country scientists and donors are imposing this value upon Pacific peoples (e.g., Cox and Elmqvist, 1993).

Biodiversity, or the variety and variability of plants and animals of any given place, is like a bank account from which people draw both their subsistence and cash incomes. Like any capital asset, the biota can be managed to maximize returns, both as income and as quality of life. McNeely et al. (1990) define the elements of biodiversity that can actually be managed as "biological resources". As the material basis for life, biodiversity, in the form of biological resources, is appreciated by rural Pacific peoples. Priority biological resources from this viewpoint are not those with the greatest numbers of taxa, but those which are most important to maintaining and improving the material economy, and to a lesser extent, at least in Vanuatu, those which have cultural significance. Over the long term and on the large scale, the conservation of biodiversity is synonymous with the maximization of human welfare, because biodiversity (encompassing biological resources) is a prime source of human wealth and well-being.

It has been my experience first in Micronesia and now in the South Pacific that the perception of what resources are needed in what condition to maintain or improve the material economy varies tremendously among Pacific Islanders, as among all people. Some articulate and follow all the arguments of developed-country ecologists, fully appreciating that biota not directly exploited may be necessary to the maintenance of populations that are, or that habitat quality is critical to the maintenance of useful organisms. Others can identify and locate many economic species, but fail to display comprehension of the critical dependencies among these species and the qualities of their habitat. Unless the people with inherited rights to biological resources appreciate these relationships, they will not be willing conservationists. The source of funds imposes biodiversity as the first criterion for determining priority for PEP intervention. However, a better motivation for participation by rural people is increased understanding of the way in which they now draw upon biological diversity and environmental quality as the basis for their livelihood, and illustration of the way in which maintenance of biodiversity and environmental well-being maintains and expands economic opportunities. PEP has recently instituted an environmental education component, not part of the original project plan, to develop these ideas.

A second criteria for determining priority for PEP intervention is ecological services-- the range of ecosystem functions that the area encompasses. Ecosystem functions are beneficial processes provided by the presence of a healthy ecosystem. For example, a forest may be valuable because it contains very many species and provides products such as pharmaceuticals and timber. Among its ecological functions are watershed protection, conserving soil and water and preventing stream and lagoon siltation. Ecosystems with many functions typically link other systems, such as

mangroves which couple terrestrial and marine systems, and are important to both. These values are sometimes perceived but expressed non-scientifically. The value to humans of ecosystem functions is not always evident to non-ecologists, but can be taught.

The third criterion for designating priority biological resources within PEP is the degree of threat that the species, community, or ecosystem faces-- biologically important areas that are under risk of degradation or conversion are those where PEP seeks to work. PEP will not use scarce project resources protecting what is not threatened.

### 1.2.2 Linkages between private enterprise and conservation of biological systems

Few societies can afford to sequester significant natural resources in strict preservation programs. Pressing human needs and legitimate economic aspirations drive individuals and governments to seek to finance development by exploiting natural resources. In order to illustrate that maintaining environmental quality and ecosystem integrity provides economic opportunity, PEP attempts to assist individuals, partnerships, companies, and communities to sustainably profit from environmental integrity.

People will use their resources. PEP's role is not to judge whether, when, or how exploitation is acceptable, but simply to assist in the generation of options for exploitation, including the best available selective exploitation controlled in space and time, and designed to maximize overall benefit to the human community. Groups of individuals exercising long term usufruct or ownership, and seeking to maintain cultural identity, tend to wish both to maintain their environment with all its attributes including biodiversity, and to enlarge access to goods and services available in developed economies.

These aspirations are usually depicted as opposing forces, but we think they can be successfully combined both to maintain environmental values and to improve material economy. Market forces alone often lead to over-exploitation because many of the costs are external to those doing the exploiting. PEP attempts to constrain its intervention so that environmental costs as well as the fruits of exploitation remain internal to the resource-holders who are the project participants. Local resource users are usually local-level decision makers. We assume that their decisions will be affected by enlightened self-interest. PEP's central hypothesis is that if people realize benefit (profit and otherwise) from conservation practices that meet their needs, they will determine that conservation is in their best interests and practice it. The PEP project is a test of this hypothesis, examining results of attempts to implement examples of types of linkages between enterprise and conservation. Our current typology of linkages and their assumed conservation values includes:

(A) Provide more sustainable exploitation practices and sufficient incentive for their adoption and people will change their behaviour. This is a very broad linkage-- many subtypes fit here, including intensifying production (farming) of a desired product in one area to reduce its exploitation in another; removing a resource from consumptive exploitation and using it instead non-consumptively, e.g., ecotourism in which beautiful forests are featured instead of clearing the land for market gardens; using agroforestry instead of clean cultivation, and so on.

(B) Give the threatened resource new or increased economic value, which will encourage its conservation.

(C) Provide alternative sources of cash; this will enable people to reduce destructive exploitation of a threatened resource and with appropriate support, they will do so.

A fourth category, so far not approved for the PEP project because it does not target the least disturbed or most diverse areas, is:

(D) Mitigate negative environmental impacts by creating enterprises that solve environmental problems, such as recycling.

Most PEP interventions now active fit more than one type of linkage. Examining the efficacy of any one type of linkage will be difficult when multiple linkages operate. Replication of interventions with varying combinations of linkage types may enable us to isolate effects of individual linkages. Some level of replication is required in any case for reliable conclusions.

### 1.2.3 The PEP Work Process

PEP operates in selected "Ecological Management Units" (EMUs), which are areas of varying sizes with their associated human communities. EMUs represent the range of resources used by the designated human community, so usually involve more than one type of ecosystem. For example, a given village may fish near shore and on a reef, have gardens and housesites upslope from the beach, and hunt and gather materials from undisturbed forest upslope from the gardens. The shore, reef, gardens, forest, and the people using them are all part of the EMU.

Project EMUs are selected first on the basis of their priority for conservation. PEP selection then involves an evaluation of the human community's desire and ability to combat threats to the resource base through ecologically sound enterprises. Such factors as demographics, experience with development projects, and community cohesiveness are considered. Site visits are made to detail enterprises, listing cash and subsistence activities in progress and noting factors supporting or suppressing enterprise in the EMU. Business opportunities in the form of unmet demands for goods or services with high potential conservation impact are sought.

Initial discussions with community leaders and selected contacts within the EMU are conducted to screen for PEP enterprises. Project staff facilitate a community assessment of their own biological resources, aimed at cataloging local knowledge of the biota, identifying problems with resource scarcity or environmental quality, and enterprise opportunities. Existing and potential enterprises are assessed with regard to potential for conservation impact. Two or more enterprises per EMU aimed at the same conservation goal are sought, thereby seeking social and economic resiliency, better monitoring network efficiency, and efficiency of social interaction. The community participates in the situation assessment and economic and environmental goal-setting, and guides the selection of enterprises. Other interested parties, including government agencies, NGOs, and community special interest groups are asked to review the program of PEP activity in each EMU.

The PEP/community or PEP/entrepreneur partnership involves mutual commitment to the PEP intervention, which includes not just the enterprise(s), but also community organizing to support the enterprise, environmental education, monitoring, and evaluation. Threats to resources are simultaneously economic, social, and cultural. Response to threats must also operate on all these levels, with guidance from the partner at all stages of activity. PEP provides services to the enterprises as needed: technical advice, business planning/advice, access to credit/capital, marketing, training, and seed money where needed. The enterprise program includes a

conservation plan focusing on the environmental aspects of the enterprise, and which provides the base-line for assessing the enterprise's conservation value.

An Initial Environmental Examination is required for every proposed enterprise. The examination reviews the degree to which an enterprise is compatible, physically and economically, with the ecosystem complex in which it will operate, and establishes criteria to monitor and assess the environmental management procedures of the enterprise. A social soundness assessment is also required for most enterprises.

## 1.3 Brief Examples of PEP Interventions

A PEP Ecological Management Unit or EMU, was selected on the north coast of the island of Ambrym, Republic of Vanuatu. The EMU, encompassing five main villages and five smaller ones, totals 750 people and 4,400 hectares. The terrain is finely dissected, narrow ridges and valleys generally steeply sloping down to the west-north-west and defining one large watershed. The area is valued for the remaining intact rainforest protecting the steep slopes above the limits of the present cultivation and because it includes the northern access to the Marum and Benbow volcanoes and surrounding wildlands. Expansion of cultivation threatens the forest.

Wild yam cultivation is one activity underway to reduce the loss of forest cover in the North Ambrym EMU. Certain wild yams, unlike domesticated yams, can only be grown under forest cover. The forest of North Ambrym is now being reduced to accommodate expansion of subsistence gardens and clean-cultivation cash-cropping of copra, cacao, peanuts, and kava. The forest now yields no products traded for cash. Production and sale of wild yams grown under forest cover will provide both food and cash from the forest. An investigation of wild yam cultivation and harvesting found these to be non-detrimental to the forest ecosystem. The PEP project is encouraging production through collecting traditional knowledge relating to wild yam cultivation, distributing planting stock, demonstrating successful wild yam farming, discussing the rationale for wild yam cultivation within its environmental education program, and furthering an existing produce distribution enterprise to buy the wild yams from growers, transport them to urban markets, and sell them to consumers eager for fresh, traditional foods. Monitoring for this intervention includes tracking areas of gardens and forest cover, the extent of wild yam plantings, and income from wild yam sales.

Another EMU is proposed for the southeast corner of the island of Santo, Republic of Vanuatu. This EMU encompasses the land of only one village, Casaveia, approximately 450 hectares. The terrain straddles the Adsone River, sloping from the north to the seashore at the south. The site was selected for its known populations of *Carpoxylon macrospermum*, a palm in what is probably the only endemic plant genus in Vanuatu, botanically important as a very distinctive genus with few close relatives, and clearly endangered (Dowe, 1989, 1991; Dowe and Uhl, 1989). The palm was apparently an important food for coconut crabs, flying foxes, and to a lesser extent, people (edible fruit) before its population declined. *Carpoxylon macrospermum* was thought to be extinct prior to rediscovery in 1987; only about 20 individuals are known to exist.

The village of Caseveia consists of one extended family, which we think will facilitate a community project. PEP is evaluating the conservation value and business feasibility of promoting the horticultural production of *Carpoxylon macrospermum* as a means to preserve the species. If horticultural production is found to be favorable to the conservation of *Carpoxylon macrospermum*, and if the villagers decide that this is the type of income generation they seek, the PEP project will establish a nursery business to produce the palm. Palms could be sold first to the domestic market, which includes a number of collectors and landscaping firms;

and later, once the population is sufficiently large, perhaps to the lucrative international palm trade, directing sales first to botanical gardens and research institutes.

Other ecologically sound enterprises include such things as an agricultural crop or technique that is protective of soil and water resources, or a business that provides income while protecting resources by removing them from direct exploitation. Tourism that is small-scale and based on the natural beauty of an area is an example of the latter. Many types of businesses, whether cash or subsistence, fit the PEP model of environmental protection. A PEP enterprise must be one that can be integrated easily into existing activities. Entrepreneurs may need tools to achieve their ends of both maintaining environmental values and generating cash. The required assistance to develop or adjust private enterprises to serve both these ends varies with the enterprise in question and the skills, capital, and technology already available in the community.

## 2.1 Status of the Use of Profit to Finance Conservation

Sustainable, for-profit use of natural resources is a very old idea deeply rooted in Pacific traditions. For example, many agricultural practices were designed to conserve and enhance soil fertility while producing crops for trade. Fish trapping and farming, to increase the abundance of food fish and improve ease of catch, is associated with many Pacific cultures. The explicit coupling of such activities to conservation goals is new in the region but not limited to the PEP project.

South Pacific examples of private-sector, cash-economy enterprises that are clearly profitable and environmentally protective are few. Several NGOs in the South Pacific are involved with projects to collect and market rainforest nuts, which falls under our conservation-enterprise linkage (B), adding new or increased economic value to a threatened resource to encourage its conservation. Trade in non-timber forest products has been used extensively in the New World tropics to further this conservation linkage (Counsell and Rice, 1992; Plotkin and Famolare, 1992), and with appropriate marketing support such as that provided by Cultural Survival Enterprises, has had some success. In Asia, trade in so-called minor forest products such as rattan have also contributed to forest retention (Godoy 1990).

FSP and other NGOs seek to use small-scale, portable sawmills to protect forest resources by providing an alternative to the wasteful exploitation typical of large-scale, commercial logging. The portable sawmill gives the landowner a means to convert trees to cash without harvesting large tracts or using heavy equipment. This falls under the PEP linkage category (A), providing more sustainable exploitation practices and incentive for their adoption. With more and better forest management and business training, and with a suitable monitoring and evaluation program, the portable sawmill programs may fulfill their promise of linking environmental protection and profit.

An example of a profitable, environmentally protective enterprise wholly under a government is the Insect Farming and Trading Agency within Papua New Guinea's Division of Wildlife. This project teaches farmers to enhance habitat for valuable insects and butterflies, and to collect and preserve them as high quality specimens (Parsons undated). Materials for collecting and handling the specimens are provided free to farmers. The agency purchases the specimens from the farmers and sells them to collectors worldwide. The putative conservation value of this project is that it increases the populations of the specimen animals, some of which would probably have been overcollected without the ranching component, assigns them a market value,

and delivers environmental education in a very applied form. No endangered species are traded.

Protected area management has long been linked with local economic development (IUCN, 1980); a more generalized approach to self-financed resource conservation has grown from this beginning. While projects attempting to use profitable enterprises to encourage conservation are new in the South Pacific, the popularity of this idea suggests that its time has come. The South Pacific Regional Environmental Programme's South Pacific Biodiversity Conservation Programme, Asia Environmental Partnership's Biodiversity Conservation Network, and programmes of other NGOs such as the World Wildlife Fund all have sustainable community development components, some explicitly focused on income generation.

## 2.2 Participation in the PEP Project

PEP is active in Papua New Guinea, Vanuatu, and Tonga. Other countries eligible for PEP projects include Fiji, Western Samoa, and Kiribati. We prefer projects identified by the resource-holders themselves, and because the project has a short life span, we are now seeking existing businesses rather than starting new ones. Anyone who has an existing project that would benefit from PEP technical support is invited to send to the PEP Project Manager a description including: the biological value of the area, the type of threat that it faces, and the types of enterprises that are proposed or exist to combat the threat. Because of the short time available, well-defined projects will receive priority attention.

Support for ecologically favorable businesses is available from many agencies (Delphos, 1990). The Environmental Enterprise Assistance Fund, Cultural Survival Enterprises, numerous divisions of USAID, Overseas Private Investment Corporation, and Department of Energy/Committee on Renewable Energy Commerce and Trade are a few of the many US-based sources.

## 2.3 Will it Work? The Future of the PEP Idea

Many paths to the conservation of vital ecosystems are open. One way is to develop conservation goals and emphasize their actualization on the ground (e.g., goal is to protect forest, action is to create a reserve). Another way is to develop and test approaches that can be applied and replicated to achieve conservation goals; in the PEP case, the approaches are the various linkages between enterprise and conservation. The emphasis in the second case is on tools for conservation; in the first case it is on the conservation action itself. While the PEP project hopes to achieve conservation of specified resources, our primary purpose is to contribute to the array of tools used to advance conservation.

The PEP project is to demonstrate working examples and approaches to profitable enterprises that enable the long-term conservation of biologically and economically vital ecosystems. If the interventions pursued are carefully selected to represent categories of linkage between enterprise and conservation and sufficiently replicated, testable general inferences can be drawn about the effectiveness of these linkages. Information about which types of linkage are most effective under what circumstances can be used to duplicate successful initiatives.

The most difficult stage in the PEP process has been identifying enterprises that gain significant conservation ground, have solid business potential, and can be implemented with local resources. Of those that have been identified, only long-term monitoring will disclose whether in fact they

persist beyond the three-year life of the PEP project and pay the expected conservation and economic dividends.

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PROFITABLE ENVIRONMENTAL PROTECTION (PEP) PROJECT

# ANNUAL SUMMARY

## Fiscal Year, 1993

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# ANNUAL SUMMARY

**The Year in Review**

The beginning of Fiscal Year 1993 found the Profitable Environmental Protection Project (PEP) field team established at the offices of The Foundation for the Peoples of the South Pacific (FSP) in Port Vila, Vanuatu. Dr. Nora Devoe, Team Leader and Conservation Biologist, joined the project on August 24, 1993 and the Enterprise Specialist, James L. Stead followed on September 1st.

September saw the convening of the PEP Project Steering Committee which included representatives from USAID, WWFI, USP and FSP/USA. Discussions centered upon the project's work scope, work process, and definition and interpretation of various terms found in the Project Paper. Opportunities for collaboration between the various represented organizations were explored. A work plan was developed to guide the first year of PEP's activities.

Throughout the remainder of the year, the field staff was primarily engaged in scanning (country selection) and scoping (EMU selection). With the assistance of Dr. Caroly Shumway and Jay Smith, USAID/RDO/SP, Chris Brady, FSP/USA, and the Pacific affiliates of FSP, the countries of Papua New Guinea, Solomon Islands, Kiribati, Western Samoa, Fiji, and The Kingdom of Tonga were evaluated as potential sites for PEP interventions.

In Vanuatu, the first Environmental Management Unit (EMU) was identified at Lolihor, North Ambrym. Proposed enterprise activities included wild yam production, a tourism project, shark fin processing and sale (subsequently discontinued) and the optimization of sales of handicrafts produced in the EMU. It soon became apparent that the Lolihor EMU, with its five major and several minor villages, represented a singular challenge with respect to achieving an EMU-wide consensus regarding the PEP intervention. To facilitate work in Lolihor, a ni-Vanuatu resident of the EMU, John Salong, joined the PEP staff as Community Liaison Officer. With the objective of establishing baseline data within the EMU, Dr. Devoe, Ethnobiologist Dr. Randy Thaman of USP Suva, and a team of Dr. Thaman's associates conducted a community natural resources assessment in Lolihor. A monitoring and evaluation workshop was conducted for the PEP staff by Barbara Wyckoff-Baird under the auspices of BSP. This focused upon developing a methodology for monitoring and evaluating activities at the Lolihor EMU.

Additional sites in Vanuatu were surveyed on the islands of Vanua Lava, Santo, Efate, and Malakula. Proposed interventions included a project to evaluate and re-establish wild yam species; development of a conservation plan for the protection of a rare and endangered palm species and a parallel enterprise activity to generate funds to support this activity; the establishment of a protected area to safeguard the exceptional biodiversity of a discrete marine area and the enhancement of related ecotourism enterprises; development of a nursery to produce seedlings for a reforestation program to counter extreme over-exploitation of a valuable timber resource, and reef re-stocking projects.

In Papua New Guinea, in collaboration with an established local NGO, PEP has been invited to participate in the development of a near-shore, small-scale commercial fishing project. A fishing project that would tap an unused flyingfish resource, and thus reduce pressure on an overused reef fishery, has been proposed for Tonga.

During the year, other meetings were held that significantly affected the PEP Project. In February, Dr. Devoe met with the PEP Advisory Committee in Washington, DC. Issues addressed included possible linkages between conservation and enterprise, multi- versus single-enterprise EMUs, and the scale of proposed enterprises. Participants expressed the belief that the scope of the project should be narrowed, that the hypotheses should be more narrowly defined, and that more emphasis should be placed upon project documentation. Attendees requested a wider distribution of PEP Project reports.

In April, these and other issues were examined at a meeting of PEP and USAID staff held in Suva, Fiji. Attending were Dr. Devoe, Kathy Fry, FSP/USA's Regional Director/Programs and Vanuatu Country Director, USAID/RDO/SP's David Leong, Project Officer, and the Environment and Science Advisor, Dr. Caroly Shumway. In particular, project management was examined to determine if the existing structure, with project management residing in FSP Headquarters in San Diego, represented the optimum approach. It was determined that the project would be better served if management were shifted to the South Pacific region. Under the new management structure, Dr. Devoe, originally hired as the Conservation Biologist and Team Leader, was promoted to the responsibility of fulltime Project Manager. All project management is now based in Vanuatu, under the direct supervision of FSP's Regional Director of Programs, Kathy Fry, who provides logistic and administrative support to PEP and liaison with FSP HQ and USAID/RDO/SP.

At this same meeting, the project's budget was recast, with more funds, and the responsibility for their expenditure, transferred to the field. Dr. Devoe prepared memos more clearly defining the PEP hypothesis and narrowing the project's work scope. RDO SP with FSP wrote an amendment to the Cooperative Agreement reflecting these ideas and the

project management changes.

A later April meeting, held in Port Vila, signaled the end of the "scanning" process, and led to the selection of additional countries for PEP activities. This meeting was attended by Dr. Devoe, Kathy Fry, Jim Stead, and David Leong and Dr. Caroly Shumway of USAID/RDO/SP. Following four days of deliberations, Tonga, Papua New Guinea, and the Solomon Islands were selected.

Late in June, PEP hosted a Monitoring and Evaluation Workshop in Port Vila. This intensive, highly participatory seminar was conducted by Patricia Larson of WWF, and WWF's consultant, Dian Svendsen. Attendees included representatives of PEP, WWFI (Australia), FSP (PEP, Vanuatu, and PNG), the Village Development Trust (PNG), Department of Environmental Conservation (PNG) and SPACHEE (Fiji). The purposes of the workshop were to develop project planning skills, techniques for engendering community participation, and a repertoire of monitoring and evaluation skills.

During the year, the PEP staff was augmented to meet the requirements of the project. In October, Henry Jeffrey joined PEP as Administrative Assistant. John Salong came on board as Community Liaison Officer in February, 1993. With the assumption of responsibilities of Project Manager, it became immediately apparent that Dr. Devoe required additional support on the conservation side. Following a lengthy search, Anita van Breda was contracted as the PEP Environmental Coordinator, and will join PEP in Vila in January, 1994. Additional local facilitators are planned for each of the EMUs.

During fiscal 1993, PEP-related USAID/RDO/SP staff were rotated. The Mission Director, Project Officer, and Advisor for Environment and Science each finished their tours of duty. Their successors effected a smooth transition into the project, and management of the project has proceeded in an orderly manner.

Following a year of on-the-ground activity, the PEP Project has made meaningful progress. Management structure has been re-ordered for more effective conduct of the project. The budget has been revised and funds moved to the field to achieve optimum effectiveness. The project has been staffed with competent persons, and it has been demonstrated that qualified consultants can be hired to augment this staff as required.

Objectives of the project have been clarified. The scope and outputs have been re-defined, and represent realistic targets. The scoping process has yielded a diverse range of interventions that will serve to test the project hypothesis.

Perhaps most important relative to the future conduct of the project, the relationship between the funding agency and those

responsible for the conduct of the project has been strengthened by closer liaison and communication. It has been amply demonstrated that the two entities work well together in advancing the PEP Project.

## Issues and Concerns

It is recognized by all that from the onset, PEP's goals were ambitious, especially when considered in the context of the short program life. Throughout the past year, project revisions have been negotiated that enhance the probability of a successful outcome. Special concern has been voiced that there will be insufficient time to complete the process and then derive "lessons learned" as required by the Cooperative Agreement. A recent understanding that this work can be carried on in parallel with ongoing project tasks, and USAID staff's offer of assistance in preparing this material, serves to diminish this concern.

With the changed prospects of additional full and part-time personnel joining the PEP staff, it has become apparent that office space within FSP/Vanuatu will be inadequate. A plan to remedy this situation is being developed.

## Outlook for Fiscal 1994

PEP enters its second year with a full slate of well considered interventions. With the scanning and scoping processes completed, the PEP staff can now focus its efforts on advancing the selected interventions. The Project Work plan for the forthcoming year sets reasonable objectives. Funding is believed to be adequate. There is every reason to anticipate that 1994 will be a year of solid accomplishment.