

**INSTITUTE OF APPLIED SCIENCES**  
**THE UNIVERSITY OF THE SOUTH PACIFIC**

USP/APN Climate Change implications on Biodiversity: Youth Scenario  
Simulations Regional Workshop

IAS ENVIRONMENTAL STUDIES REPORT NUMBER: 193

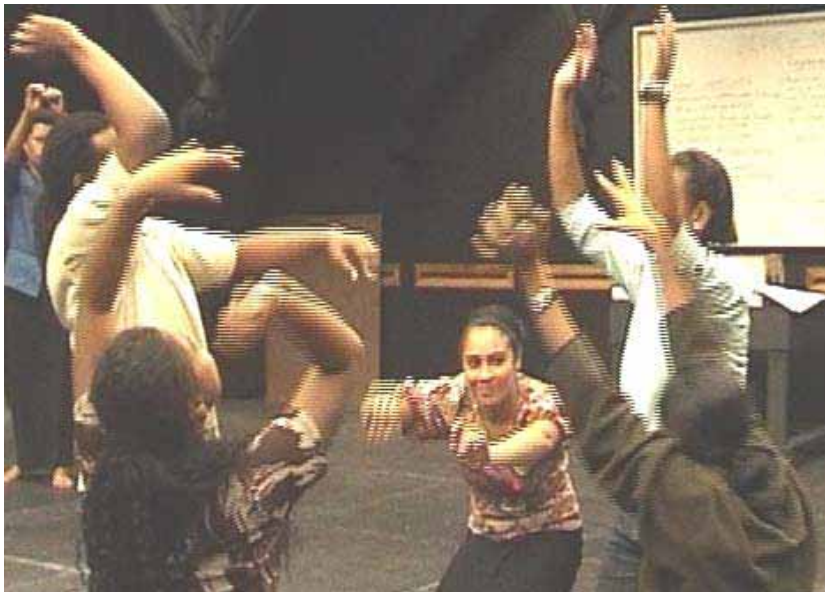
By

Sukulu Rupeni

# Report

## **USP/APN CLIMATE CHANGE IMPLICATIONS ON BIODIVERSITY – YOUTH SCENARIO SIMULATIONS REGIONAL WORKSHOP held at USP Laucala Campus, Suva**

September 18<sup>th</sup> – 22<sup>nd</sup> 2006



By Sukulu Rupeni

## ACKNOWLEDGEMENT

This is to acknowledge all the organizations and individuals for their roles in making this workshop a successful one.

- Asia Pacific Network for Global Change and Research, CAPaBLE Program
- Dr. Kanayathu Koshy, Director – PACE/USP
- Mr. Melchior Mataka, PACE/USP
- Mr. Leone Limalevu, Research Officer, PACE/USP
- Professor Randy Thaman, USP
- Dr. Frances Mugler, Acting Head of School – SLAM/USP
- Dr. Cybil Johnson, Lecture Theatre Arts – SLAM/USP
- Mr. Apete Marayawa, Tutor Theatre Arts – SLAM/USP
- Ms. Kelera Tale, Secretary – SLAM/USP
- Mr. Alifereti Tawake, Scientific Officer – IAS/USP
- Ms. Patrina Dumar, Consultant – IAS/USP
- Mr. Semisi Meo, Scientific Officer – IAS/USP
- Mr. Rusiate Ratuniyata, Postgraduate – IAS/USP
- Mr. Aisea Ratuniyata, IAS/USP
- Dr. Hugh Govan, Program Manager for Marine Conservation, FSPI
- Dr. Diane Freidzen, Climate Change Project Director – WWF/SP
- The Director, South Pacific Geoscience Commission (SOPAC)
- Ms. Peni Moore, Director Women’s Action For Change
- Cakaudrove Provincial Council Office
- Rewa Provincial Council Office
- Muaivuso Community, Navakavu, Rewa
- Navakavu Theatre Group
- Students of Theatre for Development – Theatre Arts/USP

## TABLE OF CONTENTS

<b>1.0 BACKGROUND.....</b>	<b>4</b>
<b>2.0 INTRODUCTION .....</b>	<b>5</b>
2.1 Project Description .....	5
2.2 Workshop Description.....	9
<b>3.0 WORKSHOP SUMMARY SHEET .....</b>	<b>10</b>
<b>4.0 SUMMARY OF ACTIVITIES.....</b>	<b>12</b>
<b>5.0 TRAINERS, RESOURCE SPEAKERS, FACILITATORS .....</b>	<b>13</b>
<b>6.0 TRAINEES/PARTICIPANTS .....</b>	<b>15</b>
<b>7.0 SUMMARY OF WORKSHOP PROCEEDNGS .....</b>	<b>12</b>
<b>8.0 CONCLUSION.....</b>	<b>21</b>
<b>List of Attachments:</b>	
Attachment 1 - List of Participants.....	22
Attachment 2 - List of Participants' Expectations.....	23
Attachment 3 - Climate Change and Variability Presentations.....	24
Attachment 4 - List of Key Messages to communicate and Conflicts Identified .....	28
Attachment 5 - Presentation on Biodiversity and Sustainable Development.....	29
Attachment 6 - Storylines.....	53
Attachment 7 - Songs.....	56
Attachment 8 - Results of Community Risk Assessment .....	68



## 1.0 Background

The Pacific region is made up of 22 small, scattered, isolated, developing island states and territories, many of which are low lying atolls with limited land space and human and financial resources. Its marine and terrestrial ecosystems have some of the most significant biological diversity in the world.

These islands e.g. in Fiji, Solomon Islands and Papua New Guinea have some of the most pristine ecosystems and habitats including coral reefs, sea-grass beds, mangrove forests where one can find an array of coastal and pelagic fishes, marine turtles, dugongs and whales. The islands are characterized by unique upland, montane, alpine and forests, some of which harbour endemic species. The islands' coastal ecosystems host a diversity of reef habitats on the planet, harbour the third longest barrier reef (The Great Sea Reef) and some of the most complex fresh, brackish and saltwater ecosystems. Some of these are found only in the Pacific region.

The Pacific communities depend on natural resources for their livelihoods and for maintaining their traditions and culture. While economic pressures are constantly mounting, some of these ecosystems are still in relative good condition to the extent of featuring examples of pristine habitats. However, these unique habitats, ecosystems and related resource base are under threat from impacts of climate change and variability; habitat modification and destruction e.g. coral reef and mangrove habitat, due to warming ocean temperatures and sea level rise, heavy rainfall increases amounts of silts, forest destroyed by fire and cyclones lead to loss of habitat and food, erosion and landslides etc.

These threats are worsened by expanding human populations, habitat conversions, unsustainable extracting resources, alien invasive species and environmental degradation, ultimately endangering these ecosystems. In Fiji, over the past 40 years, the increase in populations has increased the demand for agricultural land and consequently put a significant amount of pressure on arable land. This has resulted in reduced food security, increase in poverty, land degradation, reduced productivity and lower yields.

The islands' coastal marine environment is spread over an area of 1.29 million sq km. The sheer size makes its sustainable management challenging as surveillance is difficult and the resource base is under constant threat by poachers and illegal foreign fishing fleets. A lack of arable land and a growing population are leading to increased pressure on coastal resources. This is compounded by pollution originating from mining, shipping industry, tourist development, sugar and timber mills, cement factories, improper waste dumps, untreated sewerage, agrochemical leakage into the water bodies and damages to reef systems caused by mooring, silt sedimentation and introduction of alien invasive species. Over harvesting of coastal and marine fisheries is a major concern. The growing demand deriving from a rising population and the expanding trade has resulted in over exploitation of fisheries and disappearance of two species of giant clams and declining stocks for reef fish, giant clams, trochus, beche-de-mer, pearl oysters and turtles. Unsustainable or destructive fishing practices include night-time use of spear gun, plants toxic to fish, fine mesh nets, dynamite and cyanide. Coral reefs are under threat because of coral mining, unsustainable aquarium fish trade and deposit of silt due to inland erosion.

These trends coupled with the predicted yearly increase in climate change and variability impacts, threaten not only marine, coastal and terrestrial ecosystems but do also undermine local food and economic security. These cumulative stresses will profoundly inundate the Pacific Islands ability to cope.

## **2.0 Introduction**

The University of the South Pacific 's Institute of Applied Science (IAS) was awarded a grant in 2006 by the Asia Pacific Network for Global Change and Research (APN) to assist a project which seeks to raise Pacific Islanders' alertness on the impacts of climate change and variability.

This project aims to take a holistic integrated approach to sustainable development through the integration of climate change and variability with biodiversity conservation and fostering youth contribution.

The two year project is intended to be implemented as a pilot in Fiji for the first project year October 2006 – September 2007. Lessons learnt from the first year will be replicated in the Solomon Islands, Vanuatu and Tuvalu for the second year.

Key partners include USP's Pacific Center for Sustainable Development (PACE-SD) and the Foundation For the Peoples of the South Pacific International (FSP)

### **2.1) PROJECT DESCRIPTION**

#### **2.1.1 Project Rationale**

This project recognizes youth as the future custodians of the South Pacific Island's natural resources. It recognizes that climate and variability change are direct threats to the sustainable development of the Pacific's small island nations. Climate and variability change threaten the islanders' food security and source of livelihood as they are heavily dependant on their natural resources. Their tradition and culture are also threatened. To ensure security and availability of resources for future generations, the project targets youth as carriers of the message through lively and culturally appropriate means such as theatre to address and raise alertness on climate change and variability impacts on the Pacific's biodiversity.

#### **2.1.2 Project Vision:**

South Pacific Island communities' have increased alertness regarding climate and variability change impacts on biodiversity and community and have adapted to imminent threats.

#### **2.1.3 Project Goal:**

Foster South Pacific Islands community youth (the future custodians of Pacific Natural resources) contribution in resource conservation and raising alertness regarding climate change impacts and community vulnerability assessment to ensure security and availability of resources for future generations.

#### **2.1.4 Project Ojectives**

- Train and establish 3 community based theatre groups (Verata in Tailevu, Navakavu in Rewa, Naboutini in Cakaudrove) to raise awareness on climate change and variability impacts through theatre
- Conduct 30 theatre performances on climate change and variability impacts
- Undertake 3 community risk assessment workshops in project communities
- Implement 2 soft measure adaptations in each of the project communities

#### **2.1.5 Expected Outputs for Year One of Project Phase**

- Fiji youth will have enhanced capacity in theatre for climate change and variability impacts on biodiversity and participatory risk assessment
- Community Theatre groups formed
- Scripts on climate change and variability impacts on biodiversity scenarios developed
- Awareness Theatre performances on climate change and variability impact scenarios conducted
- Priority soft measure adaptations implemented

- Risk management plans developed and community risk management organisations formed

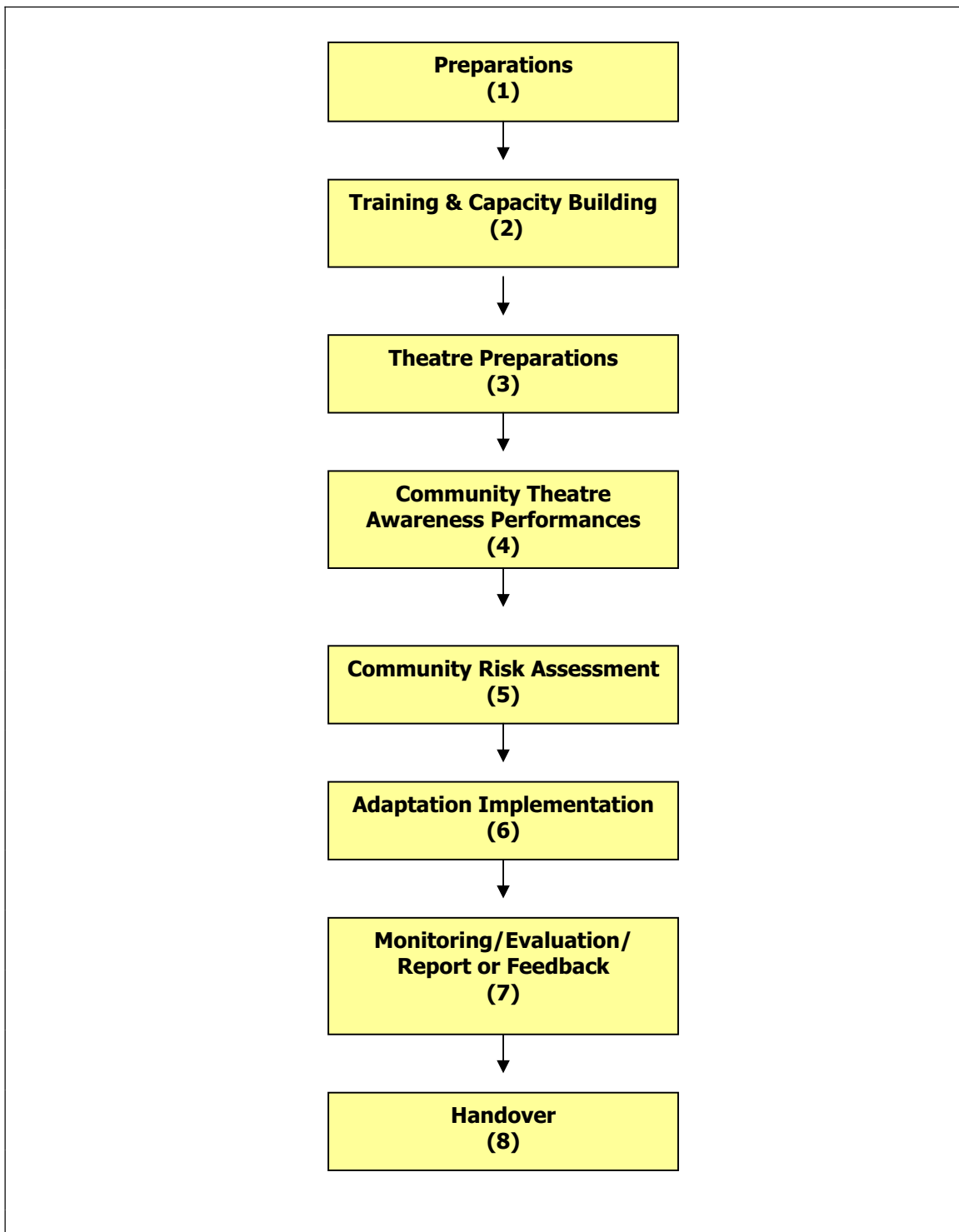
#### 2.1.6 Expected Outcomes for Year One of Project Phase

- Increased community youth understanding and participation in climate change and variability impacts awareness raising and adaptation activities
- Improved resilience of communities to climate change and variability impacts



Figure. 1 Project Target Sites – Tuvalu, Solomon Islands, Vanuatu and Fiji

### 2.1.7 Project Process:



## **2.1.8 Narratives on Project Process:**

### **1) Preparations**

This step involves the following: (i) consultation and project team meetings, mobilisation of participants and stakeholders; (ii) selection of target community youth groups. The three project communities in Fiji; Saqani in Cakaudrove, Navakavu in Rewa, Ucuivanua in Tailevu were selected due to their prior invitation for IAS to conduct theatre training. (iii) preparing workshop inputs; (iv) training materials identification, collation, development and production.

### **2) Regional/Community Training & Capacity Building**

This is the information gathering stage which includes acquiring information and understanding climate change and variability impacts on biodiversity, sustainable development and gaining skills on the use of theatre as a lively and culturally appropriate tool to address these issues. It also includes providing information on Asia Pacific Network for Global Change Research and the current project.

### **3) Script and Theatre Preparation**

This step includes: a) Training and establishing the respective community theatre group; b) Analysing information and planning – contextualising materials through defining target audience, identifying challenges, determining objectives of play or desired behavior changes, defining key messages and theme of the play and selecting approaches to be adopted; c) Construction of script through improvisation; d) Production of accompaniments; e) Play production; g) Rehearsals; h) Pre-test; i) Polish Plays; j) Community performance preparations including planning, consultation with stakeholders for performance opportunities, logistics, monitoring and feedback arrangements. It is envisioned the theatre troupes will be able to simulate 6 dramatic scenarios on the following climate and variability change impacts;- key biodiversity issues pertaining to the target communities, fresh water, agriculture, coastal and marine resources, forests, health or economy. A play could address several of these related topics but one play must address climate change impacts on biodiversity. It is assumed that each of these target communities will have at least 25 community youth members trained and involved in the project.

### **4) Community Theatre Awareness Performance**

A total of 10 community theatre performances will be conducted in total by the each of the project community theatre troupes. These performances include climate change and variability scenario simulations and post performance discussions. After a theatre performance it is expected that the theatre group will facilitate audience discussions on Climate change and variability implications on biodiversity with the hope of assisting the community develop their actions plans. Evaluation and report forms will be provided and recorded for each performance to gauge audience knowledge and assist the theatre group monitor their effectiveness and apply lessons learned. It is intended that these community theatre troupes will also provide support for government and NGO's work in climate change through drama performances to reinforce their messages.

### **5) Community Risk Assessment**

This includes participatory risk assessment workshops intended to be conducted in each of the target project communities or a relevant alternative within the district or province. This workshop will involve the whole community in assessing risks to climate and variability change impacts. It is envisioned that this workshop will be conducted in a period of 2-3 days and is expected that the workshop output should include community risk management planning which should be

supportive of existing (if there is one) resource management plan, identification of at least 2 priority soft measure adaptation options and formation of a community risk management organisation.

## **6) Adaptation Implementation**

It is expected that project community youth will implement adaptation actions. Besides community youth raising awareness on climate change and variability impacts on biodiversity they will also be implementing identified priority adaptations actions. It is hoped that this exercise will further reinforce messages youth are presenting through their performances and provide them with practical experience in risk assessment and biodiversity conservation.

## **7) Monitoring and Evaluation Reporting / Feedback**

Prepared forms will be utilised by community theatre groups to assist them in monitoring and evaluating progress. An appropriate system will be devised to collate and document these forms to provide feedback to communities, project partners and donor. It is intended that a participatory monitoring and evaluation process is undertaken involving local community, project partners, donors and other stakeholders to decide together how progress should be measured and what actions needs to be taken as a result of community risk assessment. This could take place during the national/regional Locally Managed Marine Area Network annual meeting.

## **8) Handover**

This is an added step since the initial proposal but a crucial one which signifies the end of a project phase but continued driven or managed by communities ensuring its sustainability. Local partners and stakeholders will be present to ensure sustainability.

## **2.2) WORKSHOP DESCRIPTION**

The second step in the project is the Regional Climate Change and Variability Implications on Biodiversity – Youth Scenario Simulations Workshop. The workshop is intended for participants from the 4 project countries; Fiji, Solomon Islands, Vanuatu and Tuvalu.

### **2.2.1) Workshop Objectives:**

- Introduce the Asian Pacific Network for Global Change and Research and the USP Climate Change Project
- Provide information and knowledge on Climate Change and Variability
- Provide information and knowledge on Sustainable Development and ESD
- Provide information and knowledge on Biodiversity
- Provide information and knowledge on Community Approaches
- Provide information and skills on Theatre for Development
- Provide information and skills on Participatory Risk Assessment

### **2.2.2) Expected Outputs:**

- Awareness of the APN CAPaBLE program and the USP Climate Change & Variability Project
- Gained information and enhanced understanding on climate change and variability impacts, biodiversity, sustainable development and community approaches
- Gained information and enhanced skills on community approaches, theatre for development and participatory risk assessment

- Constructed 4 story lines and songs on climate change implications on biodiversity
- Conducted a community drama performance
- Conducted a participatory risk assessment workshop

### **2.2.3) Workshop Methodology**

The workshop utilized lecture style teaching, participatory theatre energizers and games, participatory learning and action (PLA) tools.



Figure. 2 Workshop participants in group work discussion

### 3.0 Workshop Summary Sheet

TOPIC	Description
Workshop Name	Regional Climate Change and Variability Implications on Biodiversity – Youth Scenario Simulations
Funding Agency	Asia Pacific Network for Global Change and Research CAPaBLE Program
Project	Institute of Applied Science, USP Climate Change & Variability Implications on Biodiversity – Youth Scenario Simulations
Organizing Institutions	Institute of Applied Science – USP Pacific Centre for Sustainable Development - USP Foundation for the Peoples of the South Pacific Int.
Venue	Communications Building Conference Room, Laucala Campus, USP in Suva, Fiji
Dates	September 18 <sup>th</sup> – 22 <sup>nd</sup> 2006
No. of Participants	27
No. of Facilitators	8
Participating Countries	Fiji, Tuvalu and Solomon Islands
Participating Provinces in Fiji	Cakaudrove and Rewa
Participating Agencies & Govt. Depts.	Live & Learn
Method	Lecture, Theatre, Participatory Learning and Action
Project Objectives	<ul style="list-style-type: none"> <li>• Train and establish 3 community based theatre groups to raise awareness on climate change and variability impacts through theatre</li> <li>• Conduct 30 theatre performances on climate change and variability impacts</li> <li>• Train the 3 target community groups in participatory risk assessment</li> <li>• Undertake 3 community risk assessment workshops</li> <li>• Implement 3 soft measure adaptations in each of the target project communities</li> </ul>
Workshop Objectives	<ul style="list-style-type: none"> <li>• Introduce the Asian Pacific Network for Global Change and Research and the USP Climate Change Project</li> <li>• Provide information and knowledge on Climate Change and Variability</li> <li>• Provide information and knowledge on Sustainable Development and ESD</li> <li>• Provide information on Biodiversity</li> <li>• Provide information on Community Approaches</li> <li>• Provide information and skills on Theatre for Development</li> <li>• Provide information and skills on Participatory Risk Assessment</li> </ul>
Achievements	<ul style="list-style-type: none"> <li>• Raised awareness of the APN CAPaBLE program and the USP Climate Change &amp; Variability Project</li> <li>• Provided information and enhanced understanding on climate change and variability impacts, biodiversity, sustainable development and community approaches</li> <li>• Provided information and enhanced skills on community approaches, theatre for development and participatory risk assessment</li> <li>• Constructed 4 story lines and songs on climate change implications on biodiversity</li> <li>• Conducted a community drama performance</li> <li>• Conducted a participatory risk assessment exercise</li> </ul>



## 4.0 Summary of Activities

Date	Activities
Thursday Sept. 16 <sup>th</sup> 2006	<ul style="list-style-type: none"> <li>• Arrival of Regional Participant from Tuvalu</li> </ul>
Friday Sept. 17 <sup>th</sup> 2006	<ul style="list-style-type: none"> <li>• Arrival of Regional Participant from Solomon Islands. Gathering of regional participants at Peninsula Hotel, Suva, Fiji and reporting to Institute of Applied Science at USP Lower Campus.</li> </ul>
Saturday Sept. 18 <sup>th</sup> 2006	<ul style="list-style-type: none"> <li>• Arrival of Cakaudrove participants by boat and reporting to billet in Suva</li> </ul>
Monday Sept. 18 2006 (AM)	<ul style="list-style-type: none"> <li>• Registration of Participants and distribution of workshop packets</li> <li>• Opening remarks by Sukulu Rupeni, IAS/USP</li> <li>• Introduction to APN and Education for Sustainable Development and workshop opening by Dr. Koshy, Director Pacific Centre for Sustainable Development, USP</li> <li>• Exercises on expectations facilitated by Sukulu Rupeni</li> <li>• Climate Change and Variability – facilitated by Mr. Melchior Mataka</li> </ul>
Monday Sept. 18 2006 (PM)	<ul style="list-style-type: none"> <li>• Drama Script Construction</li> <li>• Basic Drama Skills – facilitated by Mr. Apete Marayawa</li> <li>• Theatre for Development – facilitated by Mrs. Cybil Johnson</li> <li>• Continued with Script Construction</li> <li>• End of Day One</li> </ul>
Tuesday Sept. 19 2006 (AM)	<ul style="list-style-type: none"> <li>• Evaluation of Day One</li> <li>• Exercises on Theatre Games</li> <li>• Biodiversity and Sustainable Development – Dr. Randy Thaman</li> </ul>
Tuesday Sept. 19 2006 (PM)	<ul style="list-style-type: none"> <li>• Drama Rehearsals</li> <li>• End of Day Two</li> </ul>
Wednesday Sept. 20, 2006 (AM)	<ul style="list-style-type: none"> <li>• Evaluation Day Two</li> <li>• Theatre Games</li> <li>• Techniques for creating scripts</li> <li>• Ideas about Adaptation Options</li> </ul>
Wednesday Sept. 20, 2006 (PM)	<ul style="list-style-type: none"> <li>• Community Approaches</li> <li>• Drama Rehearsals</li> <li>• Vulnerability Assessment</li> <li>• Discussions for field trip</li> <li>• End of Day Three</li> </ul>
Thursday Sept. 21, 2006 (AM)	<ul style="list-style-type: none"> <li>• Participants meet at USP to board bus for field trip to Muaivuso in Navakavu</li> <li>• Traditional Protocol (Sevusevu)</li> <li>• Introductions</li> <li>• Group Division and Discussions on Participatory Risk Assessment</li> <li>• Participatory Risk Assessment</li> </ul>
Thursday, Sept 21, 2006 (PM)	<ul style="list-style-type: none"> <li>• Group Feedback on Participatory Risk Assessment</li> <li>• Summary</li> <li>• Drama Group Presentations</li> </ul>

#### 4.0 Summary of Activities Cont.

Date	Activities
Thursday Sept. 21, 2006 Continued	<ul style="list-style-type: none"> <li>• Traditional Protocol (Tatau)</li> <li>• Participants board bus to return to Suva</li> <li>• End of Day Four</li> </ul>
Friday Sept. 22 2006	<ul style="list-style-type: none"> <li>• Review of the Field Trip</li> <li>• Overview of Project and Workshop</li> <li>• Song Creations</li> <li>• Way Forward</li> <li>• Workshop Closing</li> <li>• End of Workshop</li> </ul>

#### 5.0 Trainers, Resource Speakers and Facilitators

Resource person	Topics
Dr. Kanayathu Koshy, Director Pacific Centre for Sustainable Development, University of The South Pacific, Fiji.	Education for Sustainable Development
Melchior Matakai, Scientific Officer, Pacific Centre for Sustainable Development, University of the South Pacific, Fiji	Climate Change and Variability
Dr. Randy Thaman, Professor of Pacific Islands Biogeography	Biodiversity & Sustainable Development
Apete Marayawa, Tutor, School of Language, Media and Arts, University of the South Pacific, Fiji	Basic Drama Skills
Dr. Cybil Johnson, Lecturer, School of Language, Media and Arts, University of the South Pacific, Fiji	Theatre for Development
Leone Limalevu, Scientific Officer, Pacific Centre for Sustainable Development, University of the South Pacific, Fiji	Measures for Adaptation Options
Alifereti Tawake, Scientific Officer, Institute of Applied Science, University of the South Pacific, Fiji	Community Approaches
Sukulu Rupeni, Tutor, School of Language, Media and Arts, University of the South Pacific, Fiji	Constructing Scripts

#### 6.0 Trainees/Participants

Non Government Organisations (Regional/National)	<ul style="list-style-type: none"> <li>• Foundation for the Peoples of the South Pacific International               <ul style="list-style-type: none"> <li>- Solomon Island Development Trust</li> <li>- TANGO</li> </ul> </li> <li>• Live and Learn Environmental Education</li> </ul>
Community Representatives	<ul style="list-style-type: none"> <li>• Cakaudrove</li> <li>• Rewa</li> </ul>
Education Institution	<ul style="list-style-type: none"> <li>• University of the South Pacific</li> <li>• School of Theatre Arts, USP</li> </ul>

## 7.0 Summary of Workshop Proceedings

### DAY ONE – Monday 18<sup>th</sup>, September

#### 7.1 – INTRODUCTIONS

##### 7.1.1 APN, PARTNERSHIP CLIMATE CHANGE PROJECT AND EDUCATION FOR SUSTAINABLE DEVELOPMENT

Dr. Kanayathu Koshy, opened the workshop with an explanation about the Asia Pacific Network for Global Research and Change and the partnership it has with USP through the Climate Change and Variability Implications on Biodiversity – Youth Scenario Simulations Project. This was followed by his presentation on Education for Sustainable Development. After the presentation Dr. Koshy declared the workshop open.

##### 7.1.2 PARTICIPANT EXPECTATIONS

A group work exercise was conducted for participants to write their expectations of the workshop. The results revealed many expected to learn and take back to share and implement what they learnt from this workshop on climate change, climate variability, biodiversity, sustainable development and drama for community development. *(Please see Attachment 2 for Participant Expectations)*

#### 7.2 – CLIMATE CHANGE AND VARIABILITY

Mr. Melchior Mataki presented on Climate Change and Variability. Definitions on climate, weather, climate variability and change and weather events were provided. In addition, extreme weather events, tropical cyclones, droughts, extreme precipitation, climate variability and change implications on sustainable development. *(Please see Attachment 3 for Climate Change and Variability Presentation Notes)*

#### 7.3 – DRAMA SCRIPT CONSTRUCTION

Participants were divided into five working groups to discuss climate change issues presented in the previous session.

- a) To identify key climate change messages for dissemination or to be addressed through their drama productions
- b) To identify from their own experiences conflicts which could serve as basis for their drama productions.

Conflict is usually a plan that may be reduced to three stages, the presentation of a problem, its complications and its solutions. The heart of the matter is conflict – often conflict between good and evil persons or forces. Good drama must be build around a situation, problems or challenges that are interesting to an audience. Two ingredients make situations interesting: conflict and empathy. The most important ingredient of drama is conflict – a struggle between two opposing forces. This struggle can be within a character, between characters, or between a character and an outside force.

Another important ingredient of drama is empathy – a relationship that builds between actor and audience. Empathy is the emotional identification with someone or something outside of oneself.

It is 'feeling with', not 'feeling for' the character – empathy, not sympathy. The energy of the theatre is generated when an audience enters the world of the play, becomes involved in the actor's character's struggle and responds. In turn, the actor's emotions are further stirred by the response of the audience.

It was interesting to note that the most common conflict highlighted by three out of the five groups are conflicts between religion and climate change. The common explanation was people perceived natural events as being allowed by God. Participants were asked to work in their groups to develop a drama story line based on the conflict identified and to filter in the key messages they have identified for dissemination. *(Please see Attachment 4 for Key Messages and Conflicts)*

#### **7.4 – BASIC DRAMA SKILLS**

This session was facilitated by Mr. Apete Marayawa. Three essentials of drama are the voice, gesture and space. This was followed by drama exercise on the three basic elements.



Figure 2. Participants in a drama exercise

#### **7.5 – THEATRE FOR DEVELOPMENT**

Dr. Cybil Johnson presented on Theatre for Development. The concepts and process of theatre for development were provided. The concept of theatre for development is based on the bottom up development approach. It recognizes that people are at the centre of development. This means peoples security and wellbeing are at the centre of all developments, be it building roads or a cement factory etc. The nature of theatre for development is interactive and participatory involving discussions of key developmental social issues and role playing to identify solutions and adaptation options. This form of theatre is created with and by the people and builds on their perceptions, knowledge and experiences. In this way community issues are at the heart of or encapsulated in the developmental messages disseminated. Theatre for development is non confrontational, non threatening, everyone can be involved, from the elders to the little children. It makes learning interesting, exciting and enjoyable. It is the enjoyable learning experiences where people remember the most. This form of theatre is also known as minimalist theatre. This

means that actors in the play use what is readily available to them in terms of costumes and properties.

## **DAY TWO – Tuesday 19<sup>th</sup>, September**

The day began with an evaluation of Day One and exercises on theatre games.

### **7.6 – BIODIVERSITY AND SUSTAINABLE DEVELOPMENT**

Professor Randy Thaman presented on biodiversity, what it is and what it consists of. He emphasized why current development is unsustainable, what youth can do and what issues they should highlight in their messages, island biodiversity and island ethnobiodiversity as a foundation for sustainable island life, the interconnectedness and the need to take a holistic approach. *(Please see Attachment 5 for Presentation on Biodiversity and Sustainable Development).*

### **7.7 – DRAMA REHEARSALS**

Participants worked in groups to discuss and change their storylines into role plays. Each group took turns to show their role plays.



Figure 3. Participants show their roleplays

## **DAY THREE – Wednesday 19<sup>th</sup>, September**

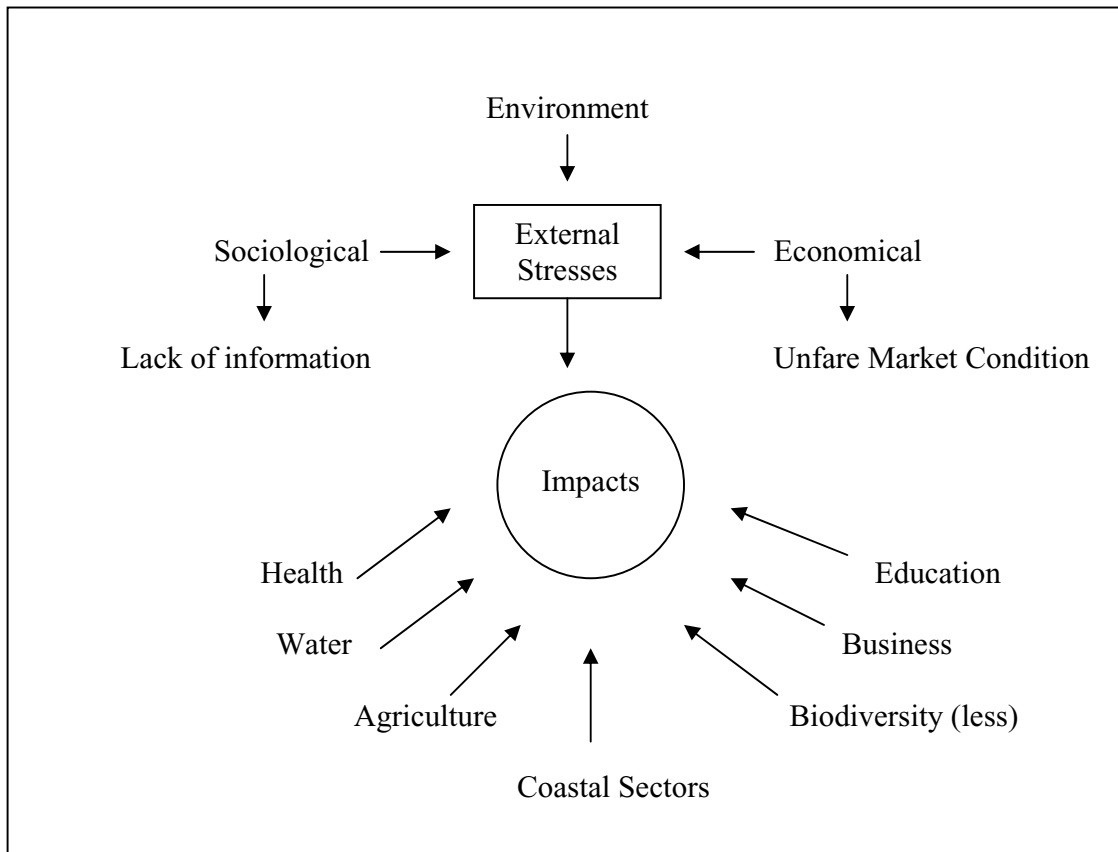
The day began with evaluation of Day Two and exercises on Theatre Games.

### **7.8 – TECHNIQUES FOR CREATING SCRIPTS**

Participants learnt to further work on polishing their role plays taking into consideration their target audience, key desired behavioral changes, selecting approaches to be adopted in their play e.g. comedy, farce, tragedy, appeal to the emotion, fear, logic, good versus evil etc. This session also included ensuring their messages were clear.

## 7.9 – IDEAS ABOUT ADAPTATION OPTIONS

This session was presented by Mr. Leone Limalevu. **Measures for Adaptation Options:**



## 7.10 – Community Approaches

This session was presented by Alifereti Tawake. Actors in theatre for development are perceived as change agents. They need to acquire skills in facilitation in order to effectively facilitate community discussions after the plays have been performed and assist communities plan for actions to be taken. Community participation is key to theatre for development as well as audience interactive techniques. They need to gain skills in participatory learning and action tools. Actors need to have the ability to work with local stakeholders i.e. to partner with local organizations and government departments that deal with similar issues e.g. disaster management, environment and resource management, etc. This is so that at the end of the project the activities are sustained. In addition, actors need to learn some basic attitudes and code of conduct of community development workers in order to gain the trust and respect of their people.

## 7.11 – Drama Rehearsal

Participants continued with polishing their dramas and ensuring key messages were included. Practice or drama rehearsal is vital for a good and effective play. Actors learn their lines, learn their movements on stage and how to react or respond to other actors in the play. This requires commitment from each actor to be on time for the rehearsals and to ensure adequate time is given for rehearsals, where actions and the messages are improved upon until it is polished and ready for the road. Also, actors learn to use properties e.g. fishing lines, boats and costumes e.g. for fish are discussed and prepared. *(Please see Attachment 6 for Storylines developed)*



Figure 4. Participants in rehearsals

## 7.12 – Vulnerability Assessment and Field Trip Discussions

Tools were selected from the Asian Disaster Preparedness Centre's Participatory Risk Assessment. The three tools selected to acquire the information needed were:

- a) transect walk
- b) historical profile
- c) ranking

Participants were split into three groups. Each group was assigned to one of the three tools to facilitate discussions during the field trip.

### **DAY FOUR – Thursday 21<sup>st</sup> , September**

Field trip to Muaivso in Navakavu.

## 7.13 – Field Trip at Muaivuso Village

Participants met at the Laucala Campus at 8:00 am to catch the bus for Muaivuso village. Muaivuso is a Fiji Locally Managed Marine Area sight, which means they have a marine protected area and is committed to the Adaptive Learning Process which includes scientific monitoring of the 'tabu' area. The village of Muaivuso is in the district of Navakavu in the

Province of Rewa. The village is situated on the tip of the Suva Penninsula opposite the capital city.

Upon arrival in the village, participants presented their 'I sevusevu' a Fijian traditional protocol to seek the favor of the village elders. The village members, facilitators and workshop participants introduced themselves before the introduction of the APN & USP Partnership project, the objectives of the regional workshop and climate change and variability impacts on biodiversity.

This was followed by an overview of the field trip program before discussions on the Community vulnerability or Risk Assessment Workshop. Participants and villagers were split into three working groups. Each group was given a tool to utilize as a means of acquiring information from the villagers to determine the communities vulnerability.

The synergy between the village elders and the young workshop participants were evident as youth were keen to practice facilitation skills and were impressed with the wealth of knowledge elders have.

After the group work each were invited to present their results. *(Please see Attachment 8 for Risk Assessment Results)*. Workshops participants then put on their plays. After the plays there was inadequate time for discussions with the villagers, so a 'I tatau' (a traditional protocol to thank the villagers for their favor and to request leave) was conducted before the workshop participants headed back to Suva.

#### **DAY FIVE – Friday 22<sup>nd</sup>, September**

The day began with a review of the field trip. This was followed by evaluation and an overview of the project and workshop.

#### **7.14 – Songs Creations**

Participants worked in groups to create songs on climate change. Songs is a great way of relaying messages especially if the tune is simple and catchy. *(Please see Attachment 7 for Songs)*

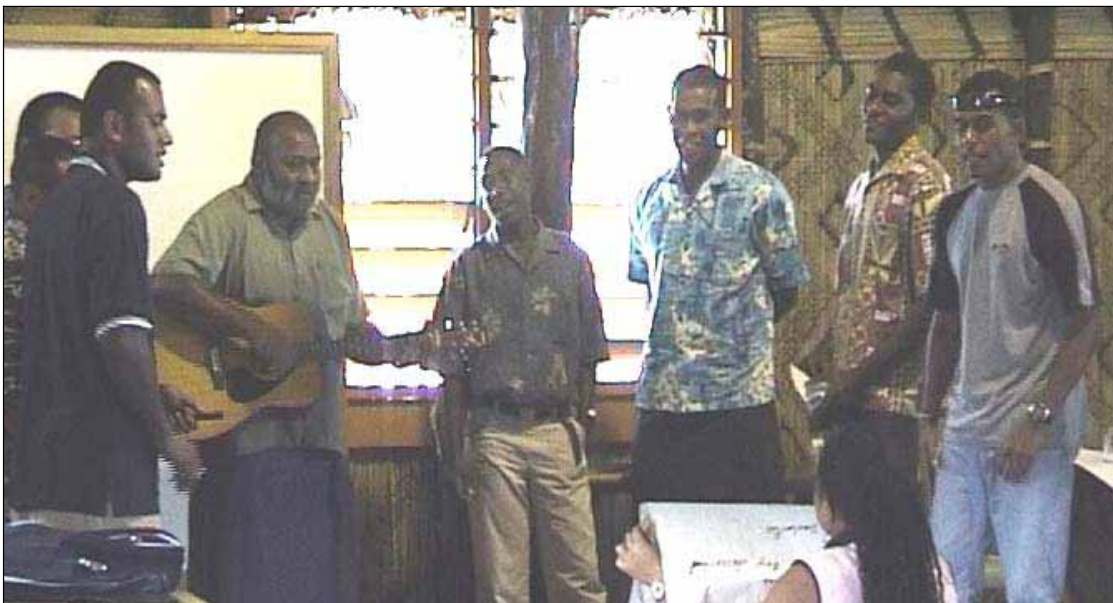


Figure 5: Participants' Create Climate Change Songs

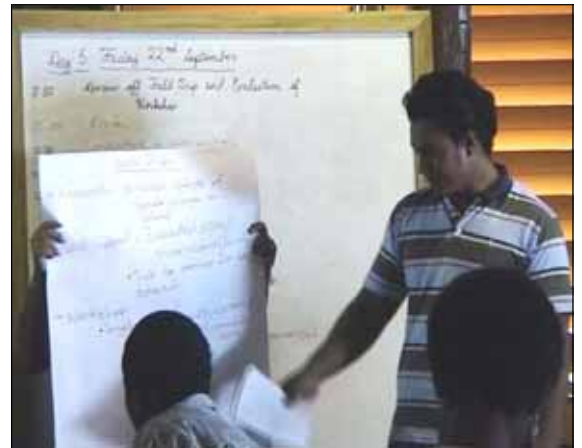


## 7.15 – Way Forward

Participants worked in their individual groups e.g. Cakaudrove, Rewa, Tuvalu and Solomon Island to discuss and present way forward after the workshop.



**Figure 6: Solomon Island participant, Joseph Keba presents way forward**



**Figure 7: Baniani Nia presents way forward for Tuvalu**



**Figure 8: Cakaudrove Youth Leader, Meli Namasi presents Way forward**

## 7.16 – Workshop Closing

The closing ceremony was held at the Bure on the Laucala Bay Campus. The chief guest was the Acting Head of School of Language, Arts and Media of USP, Dr. France Mugler. Also present were Dr. Hugh Govan, Marine Conservation Program Manager for the Foundation of the Peoples of the South Pacific International; Mr. Leone Limalevu from the Pacific Centre for Sustainable Development.

Mr. Melchior Mataki was the Master of Ceremony who assisted the chief guest hand out certificates of participation to the trainees.

## **8.0 – Conclusion**

The workshop was a success, (i) the trainees gained information and knowledge on climate change and variability impacts on biodiversity (ii) gained information and knowledge on sustainable development (iii) gained information and knowledge on biodiversity (iv) measures of adaptation options (v) community approaches and (iv) drama skills.

These sentiments were echoed by the workshop participants and they unanimously expressed recommendations for implementation of similar exercises throughout the South Pacific Region to assist community youth participation in resource management and adapting to impacts of climate and variability change.

### Attachment 1 – List of Participants

No.	Name	Age	Gender	Province	Country	Job Title	Organisation
1	Rocky Ralifo	23	M	Rotuma	Fiji	Field Officer	Live & Learn
2	Morena	29	F	Rotuma	Fiji	Field Officer	Live & Learn
3	Baniani Nakala Nia	19	M	Funafuti	Tuvalu	Classroom Assistant	TANGO
4	Keba Joseph Atkin	39	M	Central Islands	Solomon Islands	Community Development Worker	Solomon Islands Development Trust
5	Puren Teremita	29	M	Cakaudrove	Fiji	Village Youth Leader	Naboutini Village/ FLMMA
6	Meli Namasi	27	M	Cakaudrove	Fiji	Youth Leader	Cakaudrove Resource Management Support Team
7	Elisio Viliame	21	M	Cakaudrove	Fiji	Village Youth	Naboutini Village/ FLMMA
8	Jolame Sikolia	32	M	Rewa	Fiji	Fish Warden	Navakavu/ FLMMA
9	Niko Radiva	23	M	Rewa	Fiji	Farmer	Navakavu/ FLMMA
10	Alesi Likutabua Drili	27	F	Rewa	Fiji	Village Youth	Navakavu/ FLMMA
11	Manasa Masere	48	M	Rewa	Fiji	Field Officer	Rewa Provincial Office
12	Komal Kiran Pal	21	F	-	Fiji	Student	USP
13	Ema Lagilevu	20	F	Ra	Fiji	Student	USP
14	Lavenia Reid	31	F	Lau	Fiji	Student	USP
15	Maria Makereta Loma Laqeta	23	F	Rewa	Fiji	Student	USP
16	Alzima Elisha Bano	20	F	Ba	Fiji	Student	USP
17	Miliana Tarai	19	F	Tailevu	Fiji	Student	USP
18	Selina Nainoka	34	F	Tailevu	Fiji	Student	USP
19	Ela Gavoka	22	F	Nadroga	Fiji	Student	USP
20	Walter Gerard	19	M	-	Fiji	Student	USP
21	Lola Naulu	21	F	Lomaiviti	Fiji	Student	USP
22	Rister Bigha	22	F	Guadalcanal	Solomon Islands	Student	USP
23	Kartik Samy	20	M	Ba	Fiji	Student	USP
24	Samuela Rabukawaqa	22	M	Lomaiviti	Fiji	Student	USP
25	Julia Koi	22	F	Lau	Fiji	Student	USP
26	Tokasa Ramaqa	22	F	Cakaudrove	Fiji	Student	USP
27	Lemeki Rokovatulevu	21	F	Serua	Fiji	Student	USP
28	Cynthia Angco		F	-	Philippines	Student	USP
29	Viena Liti	21	F	Nukualoga	Tonga	Student	USP
30	Tiriseyani Naulivou	23	F	Tailevu	Fiji	Student	USP
31	Merari Baoa	20	F	Cakaudrove	Fiji	Student	USP
32	Alia Mohammed	23	F	-	Fiji	Student	USP
33	Kalpana Prasad	20	F	-	Fiji	Student	USP

## **Attachment 2: List of Participants' Expectations**

Climate change – the meaning of climate  
Biodiversity – how can it be affected by climate change  
How they can be expressed through drama  
Advantage of protecting our marine life  
Broaden my knowledge about climatic change and how it affects biodiversity  
To learn more things about climate change and variability  
To learn some important things from this seminar so that I can give a discussion to our community.  
To learn something new e.g. APN  
To learn about climate change and variability implications etc  
After this workshop I would like to show and teach my friends  
Broaden knowledge through biodiversity  
To learn about APN  
To learn about climate change  
To be able to go back and be a promising youth in terms of sustainable development  
To learn and know more and to be able to go back and teach and organize workshop for youths back where I come from.  
To be able to know other participants well  
To learn new skills  
To gain more knowledge  
To understand the effects of climate change  
To have and share information on climate change/theatre groups from Pacific neighbours  
To build capacity on theatre/action/drama for my community based group  
To learn a lot from this workshop to help my organization and country Solomon Islands on sustainable development  
Learn about youth role in climate change and also about climate change  
How I can develop my skills working with youth  
Building networks, meeting new people, enjoying the learning process – theme drama  
Develop my skills – continuing education training  
Learn better way to curb climate change  
What is sustainable development?  
Help community reduce the impact of climate change  
Positive things impacts after climate change  
Effects of climate change on biodiversity  
Learn about climate change impacts on the environment  
Learn ways of implementing ideas learn from workshop  
Meet new people at workshop and also learn from their openness and what they know about sustainable development and climate change  
I expect to gain skills in drama  
Broaden my knowledge on climate change/ESD/Biodiversity  
Would be able to share my experiences from this workshop with my colleagues and incorporate what I've gained into current projects  
Teach me and the participants more effectively on climate change  
Help me better understand how to deal with climate change  
How effectively and efficiently present plays to communities  
Be aware of the impacts of climate change and help community members prepare for disaster of any form  
Hear from speakers what's been happening around the region/international community regarding climate change  
Using what I learn from theatre arts class, use drama as a tool to transfer information to the community.  
Increase my knowledge on climate change  
To create and meet new friends  
To show them what I have taught in this class

# Attachment 3: Climate Change and Variability Presentation

Slide 1/2

## CLIMATE VARIABILITY, EXTREME WEATHER EVENTS AND CLIMATE CHANGE

"A description of natural climate variability, extreme events, and making the case for climate change, and its implication on the sustainable development of Pacific Islands"

Melchior Mataka

Pacific Centre for Environment & Sustainable Development  
FACULTY OF ISLANDS AND OCEANS

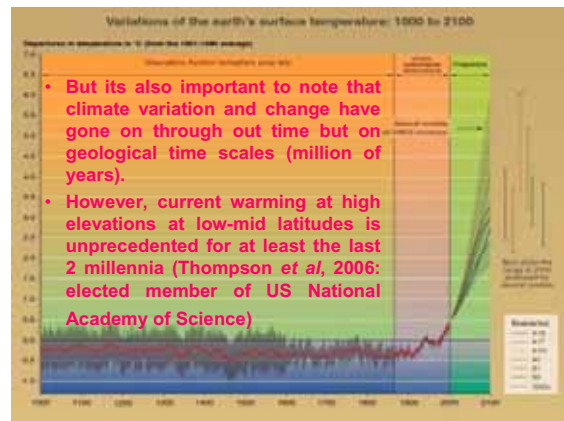
### Presentation Outline

1. Introduction
2. Definitions: Weather, Climate, Climate Variability, Climate Change and Extreme Weather Events
3. Extreme Weather Events: Tropical Cyclones, Droughts, Extreme Precipitation
4. Climate Variability: El Niño-Southern Oscillation (ENSO), Interdecadal Pacific Oscillation (IPO)
5. Climate Change: The case for, and its Implications on the sustainable development!!

Slide 3/4

### Introduction

- Why are we concerned about Climate Variability and Change?
- Climate impinges on all sectors of human livelihood, it affects our agriculture, water availability: "A major driver of life and disasters in the Pacific and Globally".
- Consequently any variations or changes to the climate is of utmost importance to all on planet earth, but especially human beings.



Slide 5/6

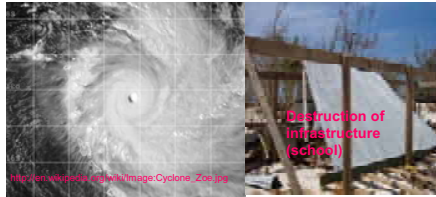
### Definitions

- **Weather:** The fluctuating state of the atmosphere around us characterized by: temperature, wind, precipitation, cloud and other weather elements.
- **Climate:** The average weather conditions in terms of the mean and its variability over a certain time span (ranging from months - 1000s to millions of years; the World Meteorological Organization has defined it as 30 years) and area.
- **Climate Variability:** Refers to variations in the mean state and other statistics (SD and occurrences of extremes etc.) of the climate on all temporal and spatial scales beyond individual weather events.
- **Extreme Weather Event:** An event that is rare within its statistical reference point (usually rarer than 10<sup>th</sup> or 90<sup>th</sup> Percentile).
- **Climate Change:** Refers to a statistically significant variation in either mean state of the climate or in its variability persisting for an extended period (typically decades or more).

### Extreme Weather/Climate Events



Slide 7/8



Satellite Image of Tropical Cyclone Zoe @ highest intensity, caused extensive in Tikopia and Anuta (eastern outlying islands of the Solomon Islands).



Slide 9/10



In Navua alone, Govt. spent ~\$US65,500 for day rations and damages to properties was estimated at \$US110,00

2. **Extreme Precipitation:** Usually associated with Tropical Cyclones, Depressions, Movements of the South Pacific Convergence Zone (SPCZ) and Madden Julian Oscillation (MJO). These usually result in flooding of low-lying areas and urban sectors without proper drainage network.



3. **Droughts:** Refers to an extended period of below normal rainfall (often associated with El-Niño Southern Oscillation). The effects vary greatly depending on agricultural, urban and environmental water needs → thirst, disease, food shortages, bush fires, loss of \$\$\$ etc.

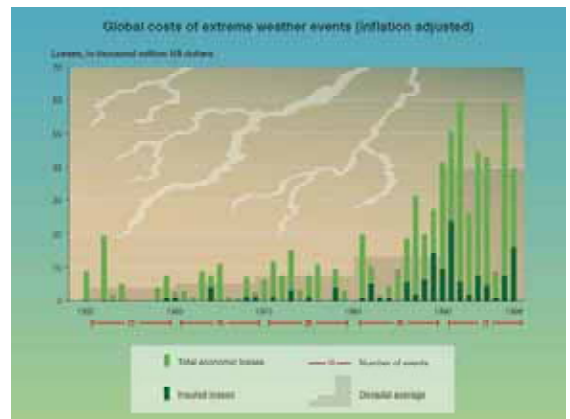
4. Fiji in 1997/98 drought incurred a loss of ~\$FJ125M in the Agricultural Sector. By Oct.1998, Govt. was spending ~\$2.7M on food rations (~240,000 people).

Slide 11/12

Estimates of confidence in observed and projected changes in extreme weather and climate events

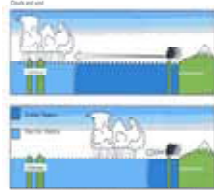
Confidence in observed changes (after half of the 20th century)	Confidence in Projections	Confidence in general claims (during the 21st century)
High	High: sea levels rising slowly and more but there's some doubt about rates	Very likely
Very likely	Slight increases in precipitation, fewer small days and less days over nearly all land areas	Very likely
Very likely	Significant increase in extreme events over most land areas	Very likely
Highly uncertain	Increases in extreme events over most areas	Very likely, over most areas
Highly uncertain	More intense precipitation events	Very likely, over most areas
Highly uncertain	Increased winter maintenance during and associated risk of drought	Highly uncertain
Highly uncertain	Decrease in tropical cyclone peak wind intensity	Highly uncertain
Highly uncertain	Decrease in tropical cyclone frequency	Highly uncertain

Source: Cubasch et al. (2001)



Slide 13/14

Climate Variability



A coupled system: Atmosphere and Ocean

1. El Niño South Oscillation (ENSO): Major source of climate variability on interannual basis in the Pacific and globally. Effects in the Pacific include depressed rainfall in the South West Pacific and increased rainfall in the equatorial North/East Pacific and, more hurricanes for Tahiti and Hawaii.

ENSO in a little detail

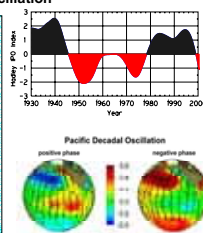
- Along the equator, the western Pacific has some of the world's warmest ocean water, while in the eastern Pacific, cool water wells up, carrying nutrients that support large fish populations. Every two to seven years, strong westward-blowing trade winds subside, and warm water slowly moves back eastward across the Pacific, like water shifting in a giant bathtub. The warm water and shifting winds interrupt the upwelling of cool, nutrient-rich water. Fish die; climatic changes affect many parts of the world. Peruvians named this phenomenon El Niño, for the Christ child, because it first appears around Christmas.
- Southern Oscillation, a more recent discovery, refers to an oscillation in the surface pressure (atmospheric mass) between the southeastern tropical Pacific (Tahiti) and the Australian-Indonesian regions (Darwin). When the waters of the eastern Pacific are abnormally warm (an El Niño event) sea level pressure drops in the eastern Pacific and rises in the west. The reduction in the pressure gradient is accompanied by a weakening of the low-latitude easterly trades.
- Recent years in which El Niño events have occurred are 1951, 1953, 1957-1958, 1965, 1969, 1972-1973, 1976, 1982-1983\*\*\*, 1986-1987, 1991-1992, 1994 and 1997.

Slide 15/16

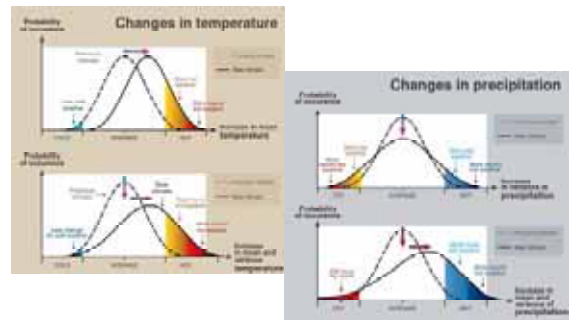
Climate Variability

2. Interdecadal Pacific Oscillation

Climate shifts driven by Interdecadal Pacific Oscillation (IPO). This is an ENSO-like feature of the climate system, but on longer time scales. The IPO operates on time scales of one to three decades. Positive IPO is associated with enhanced El Niño conditions, and Negative IPO is associated with normal fluctuation between El Niño and La Niña conditions.



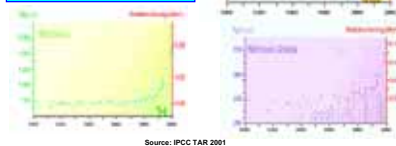
Climate Change – in brief



Slide 17/18

Evidence for Climate Change

The observations also suggest that the atmospheric abundances of almost all greenhouse gases reached their highest values in recorded history during the 1990s.

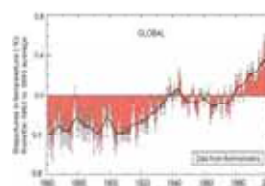


Source: IPCC TAR 2001

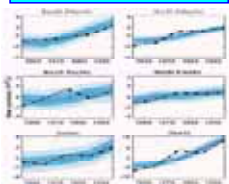
Evidence for Climate Change

Global temperature anomalies persisted above zero since 1980 - indicating warming.

Surface temperature records indicate that the 1990s have been the warmest decade of the past millennium and 1998 was the warmest year; the second warmest being 2002.



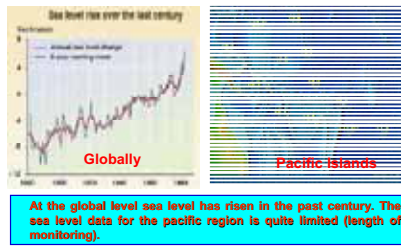
World Oceans have also warmed in the past 5 decades.



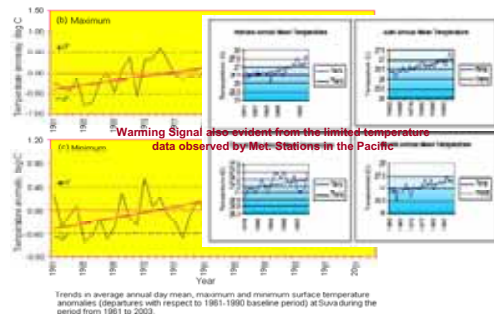


Slide 19/20

### Observed Sea Level Rise



### Temperature - Pacific Stations



Slide 21/22

### What the Experts said!!

The IPCC's Third Assessment Report reiterates that *climate change is real* and is already causing devastating impacts on humans and the environment, such as disastrous floods as well as droughts in some parts of the world, spread of diseases in tropical countries, inundation of small island states due to sea level rise, and unprecedented melting of glaciers.

### Future Climate Change Scenarios

The estimates of human induced global warming by the IPCC are based on the premise that the growth rate of atmospheric greenhouse gases will accelerate in the future.

According to most recent estimates by IPCC, the average global surface temperature is projected to increase by between 1.4° and 3°C above 1990 levels by 2100 for low emission scenarios and between 2.5° and 5.8°C for higher emission scenarios of greenhouse gases in the atmosphere.

Slide 23/24



What should we do to cope with varying and changing climate???

Tangio Tumas



## **Attachment 4: LIST OF KEY MESSAGES TO COMMUNICATE & CONFLICTS**

**(As highlighted by participants during group work session)**

### **Group A**

- Religious beliefs conflicting with climate change
- Co-relation of traditional knowledge and scientific research
- Introduction of LPG vehicles in Fiji
- Industries to start using renewable sources of energy
- Lack of funds for infrastructure equipment
- Relationships within the country (govts, NGOs, etc.) and between countries (regional and international)
- Affects everyone (business, agriculture, education, lifestyle, health)
- Everyone are stakeholders and need to be involved

### **Group B (Duavata)**

- religious teachings
- personal responsibility and sense of awareness
- lack of guidance and knowledge
- think of future (not immediate) not present

### **Group C**

- to sustain for the future generation (sustainable use of resources e.g. gold mining, tuna fishing)
- To recycle, non-biodegradable wastes like plastic bottles
- Use methods such as reforestation to conserve our forests, trees, wild life, ecosystems
- Reduce the use of CFCs such as air conditioners, fridges

### **Group D (3)**

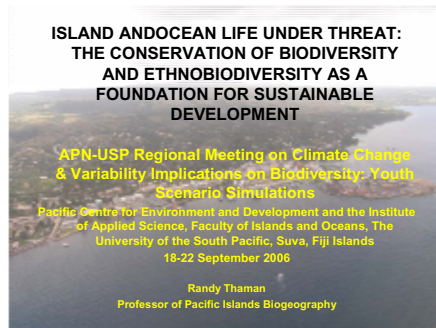
- continued trend in warming
- variation in the graphs (temperature and climate) indicating increase in temperature or climatic change
- Effects of tropical depressions (Pacific island countries do not contribute immensely to greenhouse emissions but we are the victims of greenhouse effects)
- The Pacific in the heat source of the world, local knowledge and tradition was the first indicator of the occurring EL NINO
- Climate impinges on all sectors of human livelihood e.g. agriculture, financial loss
- Impacts of climate change (health, agriculture, water resources, forest, economy)
- Major impacts of increased temperature (bleaching of coral, melting of polar ice caps)
- Conflicts in science and religion
- Different beliefs in the origins of man – the Bible says that we are the descendents of Adam and Eve whereas science states that we evolved from Apes
- Conflicts with science and nature. When a natural event occurs science tends to come up with ways to work against the natural event whereas religion sees it as something that God allowed to happen
- Conflicts with traditional agricultural implementation and modern agricultural implementation.

### **Group E**

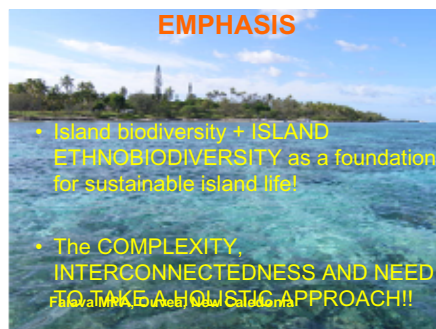
- change peoples views on how they perceive climate change
- community awareness – let people know climate change is real
- as participants of this workshop we should help others to make a difference
- Conflicts: religious thinking; traditionally; individually

## Attachment 5: Biodiversity And Sustainable Development Presentation

Slide 1/2



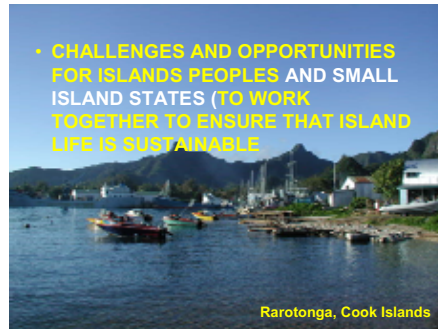
Slide 3/4



Slide 5/6



Slide 7/8



Slide 9/10



Slide 11/12



Slide  
13/14

FACTS ABOUT EUROCENTRIC DEVELOPMENT

- USA has 4.5% of world's population
- Uses about 30% of all the world's resources to maintain their standard of living AND
- Produces about 30% of the waste and pollution

FACTS ABOUT EUROCENTRIC DEVELOPMENT (Cont.)

- All of the MDCs (more developed countries) together have about 30% of the world's population
- Use about 80% of the world's strategic resources
- Produce about 75% of the waste and pollution.

Slide  
15/16

CAPITAL and DEVELOPMENT

- CAPITAL = anything needed for the "development" or "maintenance" of a system
- NATURAL and CULTURAL/HUMAN CAPITAL!!
- Capital is NOT INCOME to be spent!
- We must invest it and "live off the income"!!

\*EVERY TREE, FISH, CROP, CORAL, GROWS FASTER THAN ANY BANK ACCOUNT!!!!

CAPITAL and DEVELOPMENT

**Examples:** cash, aid, forests, fisheries resources, coral reefs, beaches, agricultural systems, land and land tenure systems, culture, traditional knowledge, LANGUAGE AND

**OLDER PEOPLE AND YOUTH!!!!** (The custodians and future users and custodians of cultural knowledge and ethnobiodiversity!!)

Slide  
17/18

CAPITAL is NOT income to be carelessly spent!!!

If we carelessly spend or destroy our capital ( cash, aid, forests, fisheries resources, coral reefs, beaches, agricultural systems, land and land tenure systems, culture, traditional knowledge, language, etc. . . We will not develop OR maintain what we have now!!!!

\*We will have unsustainable development = economic, environmental and social/cultural breakdown!!!!

IMPORTANT QUESTIONS!

- Can all LDCs (less-developed countries), SIDS, individual island countries develop like MDCs according to Eurocentric development theory?
- Are conditions the same today as when Europe and the MDCs developed?

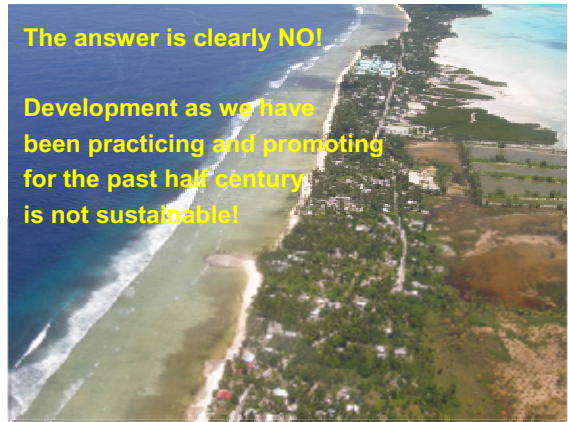
Slide  
19/20

#### IMPORTANT QUESTIONS!

- If not, how far should/can we go along this "line" to "development and "high consumption and dependence?
- How many countries, islands, communities, etc. are now in the "BONE PILE" of development and their people among the Poorest of People because they did not get the formula right or were exploited?

The answer is clearly NO!

Development as we have been practicing and promoting for the past half century is not sustainable!



Slide  
21/22

#### OTHER IMPORTANT QUESTIONS

- If we all modernize, how far should/can each of us go along this "line"?"
- How many countries, islands, communities AND THEIR YOUTH etc. are now in the "bone pile" of development and their people among the Poorest of People because they did not get the formula right or were exploited?

#### THE INTERNATIONAL RESPONSE – "Earth Summit"

- The United Nations Conference on Environment and Development (UNCED), the "Earth Summit" held in Rio de Janeiro, Brazil in 1992
- To address the problem of environmentally unsustainable development which was threatening the Earth's life support system and our human populations.

Slide  
23/24

#### THE INTERNATIONAL RESPONSE – "Earth Summit"

- The largest meeting ever held on the Earth's surface where Heads of State were present!
- Most Pacific Island countries and territories were present and presented national reports and a regional report on the state of their island and ocean environments and environmental capacities.
- The development and endorsement of Agenda 21

#### AGENDA 21

Action Plan for the Promotion of Environmentally Sustainable Development (ESD) in the 21<sup>st</sup> century

#### MAJOR OBSTACLES TO ESD

1. Increasing POPULATION in relation to land and resources.
2. POVERTY AND OVER-CONSUMPTION (are linked)

Slide  
25/26

AGENDA 21 : MAJOR OBSTACLES TO ESD  
(Cont.)

3. GLOBAL CLIMATE CHANGE AND VARIABILITY (global warming, breakdown in the Earth's stratospheric ozone layer, El Niño Events, more frequent and severe droughts and cyclones)(Convention on Climate Change - CCC)
4. LOSS OF BIODIVERSITY (our ecosystems, plants and animals and genetic diversity AND ETHNOBIODIVERSITY)(Convention on Biological Diversity - CBD)

### WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD)

Johannesburg, South Africa 2002 ("Rio +10)

Shift of Emphasis from ESD to:

"Three Pillars of Sustainable Development"

- ENVIRONMENT (Natural and Cultural)
- ECONOMY (Export, Local Cash and Subsistence)
- SOCIETY (Governance, Health, Crime, YOUTH, etc.)

Slide  
27/28

- **AND!!!**
- Environmental Blindness and Lack of Awareness of the seriousness of Environmental and Sustainable Development Crisis facing Planet Earth and its biodiversity and its human populations
- **THIS IS OUR MISSION!!!**

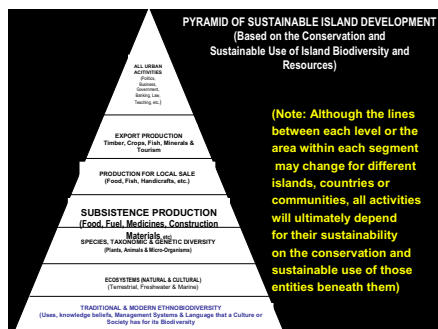
### DEFINING SUSTAINABLE ISLAND DEVELOPMENT

"Development that gains for a given island. Country, local community or individual, the money required to obtain those material and non-material goods from the modern cash economy needed to make life healthier, safer, more productive and more enjoyable

**BUT!**

Doing so without destroying the natural and human AND CULTURAL capital needed for the development of future generations."

Slide  
29/30



### BARBADOS MEETING ON SUSTAINABLE DEVELOPMENT FOR SMALL ISLAND DEVELOPING STATES (SIDS) (1993)

- The special development problems faced by small island developing states (SIDS) was recognized by the UN.
- The Barbados Programme of Action (BPoA) for the Sustainable Development of Small Island Developing States (1993) Approved (PICs have been a major players!!)



Slide  
31/32

**Barbados Plan of Action Major Concerns**

- Climate change and sea-level rise
- Natural and environmental disasters
- Management of wastes
- Coastal and marine resources
- Freshwater resources
- Land resources
- Energy resources
- Tourism resources

**Barbados Plan of Action Major Concerns (Cont.)**

- **BIODIVERSITY RESOURCES\*\***
- National institutions and administrative capacity
- Regional institutions and technical cooperation
- Transport and communication
- Science and technology
- Human resource development
- Implementation, monitoring and review

Slide  
33/34

**NEW EMERGING DEVELOPMENT ISSUES**  
(Since Barbados!)

- AIDS, Malaria and re-emergence of tuberculosis
- Drugs, alcoholism and substance abuse
- Nutrition-related human health and non-communicable diseases (e.g., diabetes, heart disease and stroke, obesity, dental disease, gout and hyperuricaemia, cancers, etc.)

**NEW EMERGING ISSUES (Cont.)**

- Coral Reef Bleaching and Death
- Breakdown in marine ecosystems and unsustainable fishing.
- Increasing landlessness and loss of **“SUBSISTENCE AFFLUENCE”** (our real protection against real poverty)

Slide  
35/36

**Unique opportunity for building bridges among ALL ISLANDS AND ALL NATIONS in efforts to conserve, sustainably use and equitably share IBD as a foundation for:**

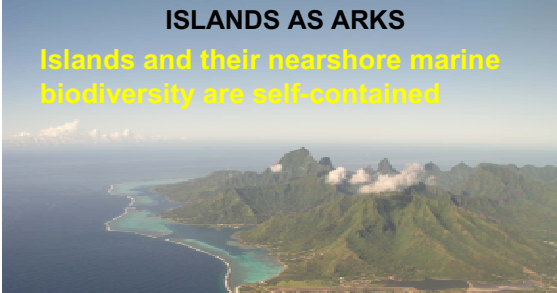


Slide  
37/38



**ISLANDS AS ARKS**

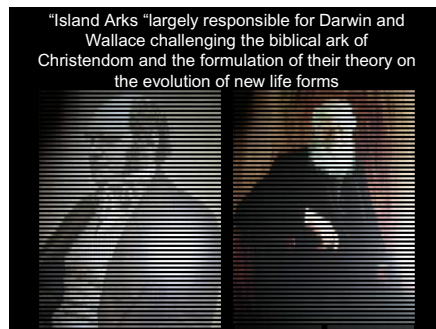
Islands and their nearshore marine biodiversity are self-contained




“arks”, each with their own unique, often very limited, assemblage of biodiversity.

Moorea, French Polynesia

Slide  
39/40



“Island Arks” largely responsible for Darwin and Wallace challenging the biblical ark of Christendom and the formulation of their theory on the evolution of new life forms



“ . . . it is not too much to say that when we have mastered the difficulties presented by the peculiarities of island life we shall find it comparatively easy to deal with the more complex and less clearly defined problems of continental distribution . . . ”

Alfred Russel Wallace *Island Life*  
(1902: 242 in Whittaker 1998)

Slide  
41/42

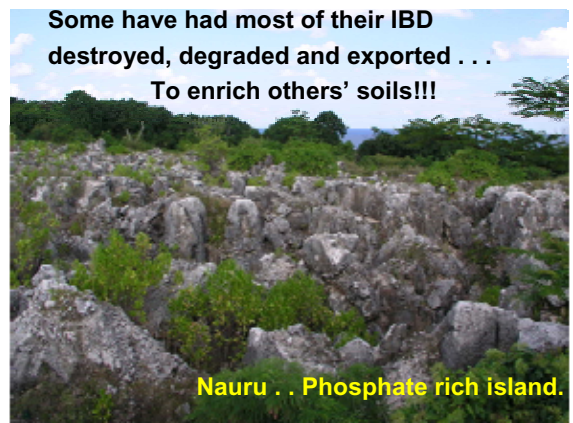


**BUT . . . Islands also include the Earth’s most biodiversity poor and highly threatened biodiversity “COOL SPOTS”!**

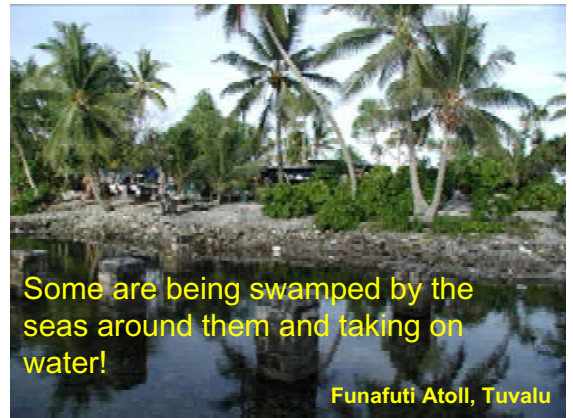
Aranuka Atoll, Republic of Kiribati



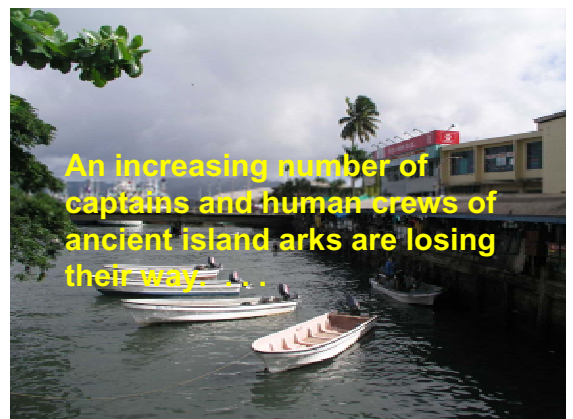
Slide  
43/44



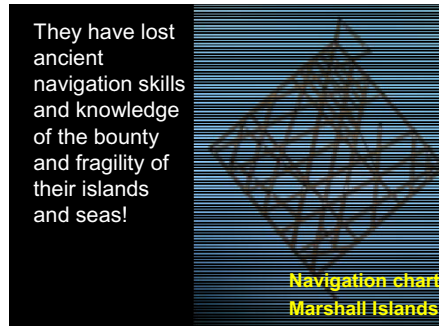
Slide  
45/46



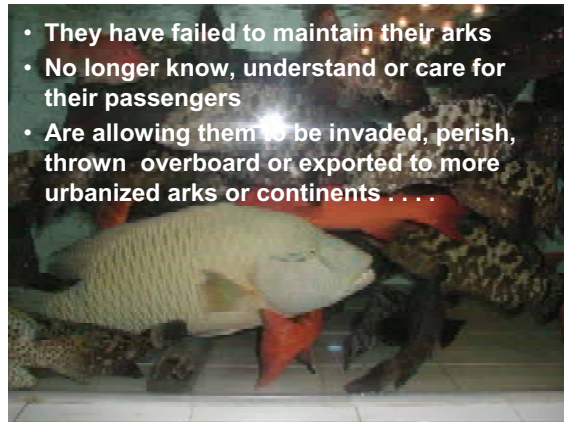
Slide  
47/48



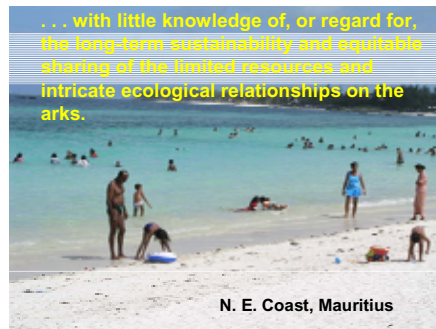
Slide  
49/50



- They have failed to maintain their arks
- No longer know, understand or care for their passengers
- Are allowing them to be invaded, perish, thrown overboard or exported to more urbanized arks or continents . . . .



Slide  
51/52



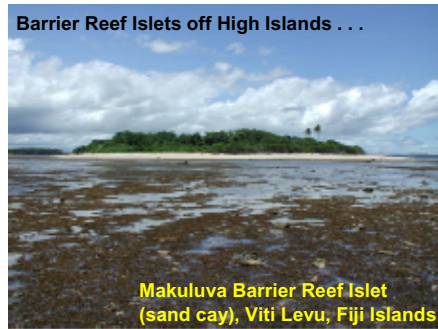
Slide  
53/54



Slide  
55/56



Slide  
57/58



Slide  
59/60





Slide  
61/62



Slide  
63/64



Slide  
65/66



Slide  
67/68



Slide  
69/70



Slide  
71/72



Slide  
73/74



**MARINE ECOSYSTEMS**

- \*Mangroves
- Fishponds/Maricultural Areas
- Intertidal Flats
- Lagoons
- Coral Reefs

- Island Shelf/Seamounts Ocean Floor
- Open Ocean/Pelagic Zone

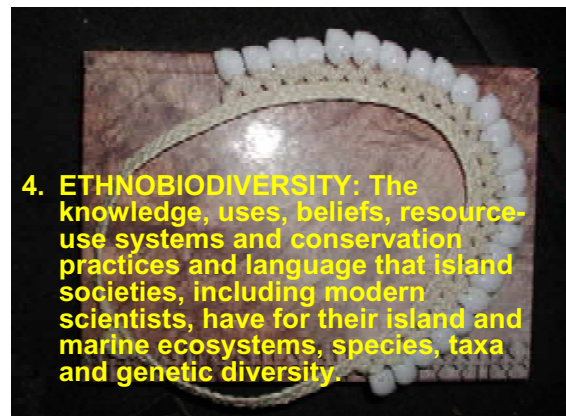
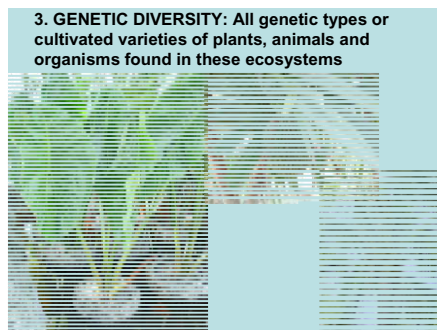
Slide  
75/76



**ISLAND TAXONOMIC GROUPS** E=ecological, S=subsistence, C=commercial importance

Class	Sub-Classes	Specific Types	Utility
Lower Life-forms		Bacteria Viruses	E, C E, S, C
Plants	Indigenous	Phytoplankton	E, S, C
	Aboriginal Introductions	Algae/Diatoms	E, S, C
	Recent Introductions	Fungi	E, S, C
	Wild Plants	Mosses	E, S
	Domesticated Plants	Other Lower Plants	E, S, C
	Food Plants	Ferns	E, S, C
	Non-Food Plants	Herbs/Forbs	E, S, C
	Terrestrial	Grasses/Sedges	E, S, C
	Freshwater	Veget	E, S, C
	Marine	Shrubs	E, S, C
		Trees	E, C, C
Animals	Indigenous	Protozoa	E, S, C
	Aboriginal Introductions	Zooplankton	E, S, C
	Recent Introductions	Sponges	E, S, C
	Wild Animals	Coral	E, S, C
	Domesticated Animals	Jellyfish	E, S, C
	Food Species	Worms	E, S, C
	Non-Food Species	Molluscs	E, S, C
	Terrestrial	Insects	E, S, C
	Freshwater	Crustaceans	E, S, C
	Marine	Echinoderms	E, S, C
		Other Invertebrates	E, S, C
		Fish	E, S, C
		Amphibians	E, S, C
		Reptiles	E, S, C
		Birds	E, S, C
	Non-Human Mammals	E, S, C	
	Humans	E, S, C	

Slide  
77/78






Slide  
79/80

**ISLAND ETHNOBIODIVERSITY AS CENTRAL TO THE DEFINITION**

- On islands, people and their knowledge, traditions and spirituality are seen as inseparable from their terrestrial, freshwater and marine ecosystems rather than as separate external entities, as embodied in concepts of:
- **kastom**/custom or **ples**/place in Melanesia
- **vanua**/land and **iqoliqoli**/fisheries in Fiji;
- land/**fonua**, **fanua**, **fenua**, **whenua**, **henua**, 'enua, etc. throughout Polynesia
- **te aba** and **bwirej** in Kiribati and the Marshall Islands in Micronesia

**UNIQUENESS AND VULNERABILITY OF ISLAND AND MARINE BIODIVERSITY**

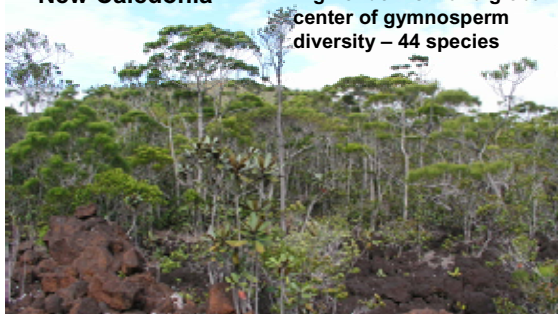


Slide  
81/82

Very **high** AND very **low** levels of endemism (UNIQUENESS)

Biodiversity “Hot Spots” and “Cool Spots”

**New Caledonia** High endemism and global center of gymnosperm diversity – 44 species



**NO NATIVE GYMNOSPREMS ON ATOLLS AND MOST SMALL OCEANIC ISLANDS**

Slide  
83/84

13 of 19 *Araucaria* species worldwide



Isle of Pines, New Caledonia

**ENDEMIC PALMS**



**Cuba** **Mauritius**

Slide  
85/86



With high endemism and rare plants  
and animals



Slide  
87/88



Slide  
89/90



Species and taxonomic POVERTY  
and DISHARMONY on small and distant  
islands





Slide  
91/92

- Fern species drops from 230 in Fiji to 215 in Samoa, 150 in the Society Islands and to only 9, 6, 5 and 5 species, respectively, in the atoll of the Marshall Islands, Tuvalu, Kiribati and on Tikehau Atoll in the Tuamotus
- Native flowering plant (angiosperm) genera drops from 654 in Solomon Islands, to 476 in Fiji, 302 in Samoa, 263 in Tonga and Niue, and 201 in the Society Islands, and to only 57, 56, 50 and 45 for the Marshall Islands, Gilbert Islands, Tuvalu and Tikehau Atoll in French Polynesia

**Poverty of Terrestrial Taxa (cont.)**

- Among orchids, which are famous for the high dispersability of their very small light seeds, this same attenuation and almost absolute poverty on atolls is reflected, with the number of orchid species dropping from over 3000 for Papua New Guinea, which has one of the richest orchard floras in the world, to 164 for Fiji, 100 for Samoa, only 3 for Hawai'i and NONE for the low-lying atolls of Micronesia and Polynesia

\*\*Although nearby raised limestone islands, such as Makatea, which is located in the Central Pacific only a short distance from the atolls of Tikehau and Rangiroa in the Tuamotus, has two orchid species

Slide  
93/94

- Taxonomic Poverty in Among Terrestrial Vertebrates**
- Resident land birds species drops from 520 in New Guinea, to 127 in Solomon Islands, 54 in Fiji, 33 in Samoa, 17 in the Society Islands and 11 in the Marquesas, and to 9, 1, 2, 1, 1 and 2 for atolls groups of the Tuamotus, Marshall Islands, the Gilberts, Phoenix and Line Islands
  - In the case of frogs, for the continental island of Papua New Guinea there were 197 species described as of the late 1990s, the majority of which were endemic either to the island of New Guinea or Papua New Guinea, 2 species for the large oceanic high islands of Fiji and none for the atolls, Tonga and the more isolated oceanic islands on the Pacific

- Taxonomic Poverty in the Marine Environment**
- Cowrie species decline from 70 in the Philippines, to 57 in Fiji and 34 in Hawai'i and only 18 from Funafuti and Nukufetua Atolls in Tuvalu
  - inshore finfish species range from about 2,500 for the Philippines, to 2000 for Papua New Guinea, 1,357 for Palau-Yap, 1,149 for the eastern Caroline Islands, 1000 for New Caledonia, 900 for Fiji, 915 for Samoa, 872 for the Marianas, 827 for the Marshall Islands, 633 for the Society Islands, 460 for the Hawaiian Islands, 350 for the Marquesas, 250, for the Pitcairn group and 125 for Easter Island
  - Similar attenuation in the genera of reef forming (hermatypic) corals from the Philippines, Indonesia and Papua New Guinea in the center of coral diversity

Slide  
95/96

Approximate estimated number of hermatypic (reef forming) coral genera in selected Pacific Islands (Atolls)

Papua New Guinea, Philippines, Indonesia	70- 82
Solomon Island, Vanuatu, New Caledonia, Fiji, Ontong Java Atoll	60-70
Kiribati, Tuvalu, Guam, Northern Marianas	50-60
Marshall Islands, Samoa, Cook Islands, Phoenix Atolls	40-50
Hawaiian Islands, Marquesas Islands, Line Atolls	10-20
Society Islands, Tuamotu Atolls	30-40
Pitcairn Island, Oeno Atoll	5-10

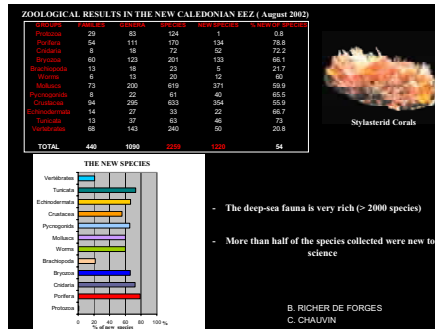
**SPECIFIC RICHNESS AND SEAMOUNTS VULNERABILITY**

Bertrand RICHER DE FORGES  
Céline CHAUVIN

IRD  
BPAS  
Nouméa Cedex  
NEW CALEDONIA

<http://WWW.tropicaldeeps seabenthos.org>

Slide 97/98




### LIVING FOSSILS OF THE NORFOLK RIDGE SEAMOUNTS

A large number of species from the Norfolk Ridge Seamounts are archaics

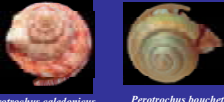
**Crinoids :**  
of the 14 genera of New Caledonia, 8 are « living fossils » close to mesozoic fauna

**Brachiopods :**



*Neoancistrocrania norfolki*

**Gastropods Pleurotomariidae :**  
4 species in New Caledonia



*Perotrochus caledonicus*      *Perotrochus bouchei*

*Gymnocrinus richeri*

*Caledonicrinus vanbani*

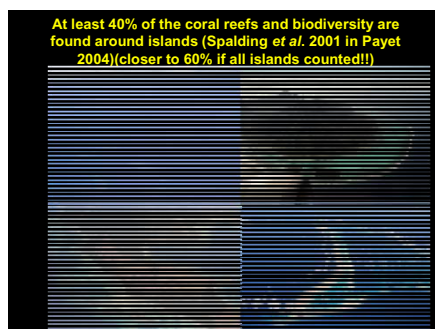
B. RICHER DE FORGES  
C. CHALVIN

Slide 99/100

Low proportion and vulnerability of indigenous species to alien invasive species on small islands and in densely settled areas

- Inordinate importance of marine biodiversity to islands, and
- Increasingly realisation its fragility and threatened status of marine biodiversity

Slide 101/102

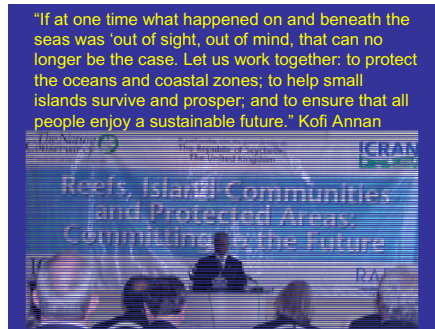


### STATUS OF CORAL REEFS

- 20% of the world's coral reefs have effectively been destroyed and show no immediate prospects of recovery
- About 60% of the 16% of the world's reef that were seriously damaged in the 1998 bleaching event are not recovering well.
- 24% of the world's reefs are under imminent risk of collapse through human pressures and a further 26% are under a longer term threat

Wilkinson 2004

Slide  
103.104



ECOLOGICAL AND CULTURAL FUNCTIONS AND USES TREES ON ISLANDS		
<b>ECOLOGICAL</b>		
Shade	Soil Improvement	Animal/Plant Habitats
Erosion Control	Marine Spawning Grounds	Flood/Runoff Control
Wind Protection	Wild Animal Food	Weed/Disease Control
Coastal Reinforcement	Water Purification	Protection From Salt Spray
<b>CULTURAL/ECONOMIC</b>		
Timber (commercial)	Brooms	Prip or Niras Plants
Timber (subsistence)	Parcelization/Wrapping	Staple foods
Fuelwood	Abrasive	Supplementary Foods
Boatbuilding (canoes)	Illumination/Torches	Wild/ Snack/Emergency Foods
Sails	Insulation	Spices/Sauces
Tools	Decoration	Teas/Coffee
Weapons Hunting	Body Ornamenatation	Non-alkoholic Beverages
Containers	Cordage/Lashing	Alcoholic Beverages
Woodcarving	Glues/Adhesives	Stimulants
Handicrafts	Caulking	Narcotics
Fishing Equipment	Fibre/Fabric	
Floats	Dyes	Masticants/Chewing Gum
Toys	Plated Ware	Meat Tenderiser
Switch for Children/ Discipline	Hats	Preservatives
Brush/Paint Brush	Mats	Medicines
Musical Instruments	Baskets	Aphrodisiacs
Gages/Roots	Commercial/Export Products	Fertility Control
Tannin	Ritual Exchange	Abortifacients
Rubber	Poison	Scents/Perfumes
Oils	Insect Repellents	Recreation
Toothbrush	Deodorants	Magic-religious
Toilet Paper	Embalming Corpses	Totems
Fire Making	Lovemaking Sites	Subjects of Mythology
		Secret Meeting Sites

Source: Adapted from Thaman and Clarke 1993.

Slide  
105/106

- Cultural Utility of Coastal Plants**
- 75 different purpose/use categories for 140 common Pacific Island coastal plants almost all of which are found on atolls.
  - Frequency of usage for the 140 plants was 1024, an average of 7.3 purpose/use categories per plant, ranging from no reported uses for only two species to as many as 125 for the coconut
  - Another 17 species have 20 or more reported uses
  - 29 species have at least 7 uses each

- Most Widely Reported Uses of Pacific Island Coastal**
- Medicine
  - general construction
  - body ornamentation
  - Fuelwood
  - ceremony and ritual
  - cultivated or ornamental plants
  - Toolmaking
  - food
  - boat or canoe making
  - dyes or pigments
  - magic and sorcery
  - fishing equipment
  - cordage and fibre
  - games or toys
  - perfumes and scenting coconut oil
  - fertiliser and mulching
  - Woodcarving
  - weapons or traps
  - food parcelisation or wrapping, subjects of legends, mythology, songs, riddles, and proverbs, domesticated and wild animal feed, handicrafts, cooking equipment, clothing, fish poisons, items for export of local sale, adhesives or caulking, and musical instruments

Slide  
107/108

- MEDICINAL USE MOST COMMON**
- 113 OF 140 species (81%) reportedly used medicinally
  - A quarter (27) are used medicinally for a variety of purposes, often the same purposes, wherever they are found throughout the Pacific, as well as in southeast Asia the ancestral homeland of Pacific peoples
  - The effectiveness of these medicines has been recorded scientifically in writing by Chinese "doctors" and Indian Auryvedic medicinal practitioners for over 800 years (!).
  - In most rural atoll communities, there is little or no access to modern medicines and an almost exclusive dependence on traditional medicines to treat all diseases, sicknesses, injuries and other complaints.
  - Supported by current studies in the Marshall Island (where there are only about 60 indigenous plants, 66 plants), almost all of which were indigenous atoll plants were used by at least one of over 50 participants in workshops conducted in 2001 and 2002.
- \*\* To replace these with modern medicines is almost impossible.

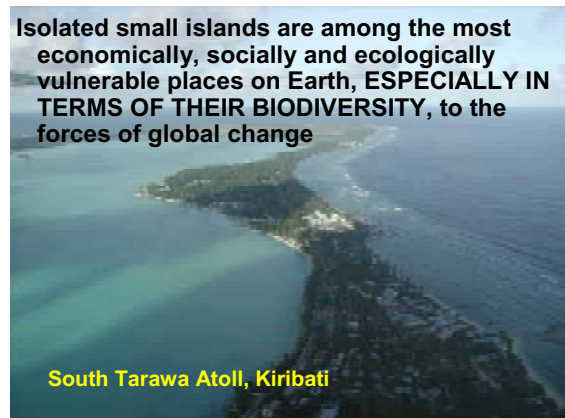
- IMPORTANCE OF MARINE BIODIVERSITY**
- There are over 200 species of finfish that are reportedly sold or are important subsistence foods on :
- rabbitfishes (*Siganus* spp.)
  - parrotfishes (*Scarus* and *Leptoscarus* spp.)
  - jobfish and deepwater snappers (*Aphareus*, *Pristipomoides* and *Etelis* spp.)
  - goatfishes (*Mullodichthys*, *Parupeneus* and *Upeneus* spp.)
  - rockcods or coral trouts (*Cephalopholis*, *Plectropomus* and *Epinephelus* spp.);
  - surgeonfishes (*Acanthurus* spp. and *Ctenochaetus striatus*)
  - seaperches or snappers (*Lutjanus* and *Macolor* spp.)
  - big-eye scad (*Selar crumenophthalmus*)
  - unicornfishes (*Naso* spp.)
  - tunas (*Gymnosarda*, *Katsuwonus* and *Thunnus* spp.)
  - emperors (*Lethrinus* spp.)
  - mullets (*Crenimugi*, *Ellochelon* and *Liza* spp.);
  - soldierfishes and squirrelfish (*Sargocentron*, *Myripristis* and *Neoniphon* spp.)
  - trevallies (*Carangoides*, *Caranx* and *Gnathanodon* spp.)
  - barracudas (*Sphyræna* spp.)
  - wrasses (*Cheilinus* spp.)
  - Eels (*Gymnothorax*, *Echidna* and *Siderea* spp.)
- Together, these finfish, constitute the most important source of animal protein and, along with coconut, energy (Thaman *et al.* 1997).

Slide  
109/110

**SMALL-ISLAND REALITIES**

- Small, geographically isolated, resource-poor islands scattered over vast expanses of ocean.
- Very little potential for modern commercial economic development.
- Almost entirely dependent on their limited biodiversity inheritance for their ecological, economic and cultural survival.

Isolated small islands are among the most economically, socially and ecologically vulnerable places on Earth, **ESPECIALLY IN TERMS OF THEIR BIODIVERSITY**, to the forces of global change



Slide  
111/112

- Despite the poverty, fragility and threatened status of ISLAND biodiversity

and

Despite the obligate dependence of small island peoples on biodiversity

**THE SMALL ISLANDS HAVE RECEIVED LIMITED ATTENTION FROM THE INTERNATIONAL CONSERVATION AND DEVELOPMENT COMMUNITY**

If we are really worried about biodiversity conservation for the benefit of the people who know and depend on it . . .

. . . we must give higher priority to the protection of the “biodiversity cool spots”, the atolls, small oceanic islands and areas that are highly disturbed (“unpristine”) and heavily populated.

Slide  
113/114

**“DIRECT THREATS” TO ISLAND BIODIVERSITY**

- High Frequency of Extreme Events/Natural Disasters/El Niño
- Global Warming/Eustatic Sea-Level Rise
- Stratospheric Ozone Depletion and Increasing UV-B Radiation



Slide  
115/116



Slide  
117/118



**THREATS TO ISLAND BIODIVERSITY (Cont.)**

- Breakdown and simplification of the species composition and trophic structure of atoll terrestrial, freshwater and marine ecosystems and ECOSYSTEM FUNCTIONS
- Degradation of uninhabited islands and islets
- Inland Deforestation and Forest Degradation

Slide  
119/120

**THREATS TO ISLAND BIODIVERSITY (Cont.)**

- Coastal and Mangrove Deforestation and Degradation
- Degradation of Freshwater Resources and ecosystems
- Agricultural Simplification and Degradation, Agrodeforestation and the Loss of Biodiversity in Agricultural Systems

**THREATS TO ISLAND BIODIVERSITY (Cont.)**

- Degradation of biodiversity by domestic livestock
- Destruction due to feral animals
- Alien Invasive Plants and Animals
- Pest and Disease Infestations and Epidemics



Slide  
121/122

**THREATS TO ISLAND BIODIVERSITY (Cont.)**

- **Fire/Indiscriminate Burning**
- **Overexploitation/Unsustainable Use of Terrestrial Plant and Animals Resources**

**THREATS TO ISLAND BIODIVERSITY (Cont.)**

- **Destruction and Degradation of Productive Marine Ecosystems and Disruption or Change in the Dynamics of Marine Ecosystems**
- **Overexploitation and Unsustainable Use of Marine Resources**
- **Use of Destructive Fishing Technologies**

Slide  
123/124

**THREATS TO ISLAND BIODIVERSITY (Cont.)**

- **Illegal Fishing**
- **Solid Waste Disposal**
- **Pollution of Freshwater Resources**
- **Air Pollution**
- **Marine Pollution**

**THREATS TO ISLAND BIODIVERSITY (Cont.)**

- **Indiscriminate and Increasing Use of Pesticides**
- **Hazardous/Toxic Waste Disposal**
- **Nuclear/Radioactive Pollution and Contamination**

Slide  
125/126

**II. "INDIRECT" THREATS (SOCIAL, INSTITUTIONAL AND INFRASTRUCTURAL) TO ISLAND BIODIVERSITY**

- **Uncontrolled Population Growth**
- **Loss of Ethnobiobiodiversity (Traditional Ethnobiological Knowledge)**
- **Breakdown in Traditional Diversified Subsistence Economy**

**"INDIRECT" THREATS TO ISLAND BIODIVERSITY (Cont.)**

- **Inadequate Modern Scientific Baseline Knowledge of the Nature and Status of Biodiversity**
- **Inadequate Systems of Marine and Terrestrial Conservation Areas**
- **Inadequate Capacity to Deal with Terrestrial, Freshwater and Marine Invasive Species**
- **Inadequate Legislation/Legal Instruments**

Slide  
127/128

**"INDIRECT" THREATS TO ISLAND BIODIVERSITY  
(Cont.)**

- **Inadequate Infrastructure/Capacity for Biodiversity Conservation**
- **Rapid and Uncontrolled Urbanization**
- **Unforeseen Large-scale Developments**
- **Free Trade/Globalization and Increasing International Free Trade in Biodiversity**

**"INDIRECT" THREATS TO ISLAND BIODIVERSITY  
(Cont.)**

- **Poverty and Economic Deterioration**
- **Gender Inequity in the Control, Use and Management of Biodiversity**
- **Political Instability, Corruption and Political Ignorance or lack of Political Will to Commit to Conservation**

Slide  
129/130

**Terrestrial Organisms that are rare, endangered or in short supply and in need of some form of protection**

- **native coastal littoral plants**
- **mangrove plants**
- **native inland trees and plants**
- **cultivated trees and plants**
- **plant cultivars/varieties**

**Threatened Terrestrial Island Organisms (Cont.)**

- **native insects/arthropods**
- **land crabs**
- **molluscs/land snails**
- **other native invertebrates (insects,**
- **native reptiles and amphibians**
- **native birds**
- **native mammals**
- **humans (ethnobiological knowledge)**

Slide  
131/132

**Threatened Marine Organisms in need of some form of protection in the atolls**

- **seaweeds (marine macro-algae)**
- **sea grasses**
- **foraminiferans and other sand producing organisms**
- **stony reef-forming corals**
- **shellfish (giant clams, trochus, turban snail, pearl oyster, triton)**
- **bêche-de-mer/holothurians**
- **crabs, lobsters, mantis shrimp**
- **eels (conger, moray)**

**Threatened Marine Organisms**

- **large demersal finfish (rockcods, wrasses, parrotfish)**
- **other reef and lagoon fish (mulletts, scad mackerel, etc.)**
- **sharks and rays**
- **billfishes**
- **tuna species (big-eye tuna)**
- **turtles**
- **sea birds**
- **mammals (dugongs, whales, dolphins)**

Slide  
133/134

#### OUR GOAL

To keep island arks afloat and to protect and enhance the capacity of the crews (the international development elite and local island communities), with both traditional and modern knowledge) so that all of the passengers are safe and the supporting on-board cargo and infrastructure are conserved, sustainably used and shared equitably so that countless future island voyages will remain on sustainable seas and find landfalls on healthy island coastlines.

#### CRITERIA FOR SUCCESS

- Be holistic, innovative, adaptive
- focus, not only on the “hot spots” and pristine areas, but also on the Earth’s “cool spots” and some of the most highly degraded and non-pristine islands and areas of islands, where people live.
- Focus on both inhabited and uninhabited islands, large and small.

Slide  
135/136

- Focus on both “wild” and cultural ecosystems, because the latter, on land, are normally, by far, the most useful and highly threatened
- Focus on the conservation of entire island ecosystems, including their terrestrial, freshwater and marine biodiversity, which are all interlinked. Particular stress is placed on focusing on the emerging seriously threatened status of marine biodiversity and that this is linked with IBD Conservation.

- Focus on BOTH species extinction and endangerment (which often focuses on endemic, “flagship species” or charismatic megafauna) AND

extinction and extirpation and economic extinction of populations and genetic varieties of culturally important, often ubiquitous, plants, animals and other organisms.

Slide  
137/138

- Carefully consider the merits of both *in situ* and *ex situ* conservation.
- Work from the international and national levels right down to the local island and community and landowner levels.
- Combine the best modern science and taxonomy with the best traditional and indigenous science and taxonomy to identify key species, threats and actions.

#### CRITERIA FOR SUCCESS (Cont.)

First and foremost concentrate on awareness raising, education and capacity building at all levels, because, without awareness of the “islands and ocean biodiversity” crisis and how it affects both islands and our planet Earth, we may be throwing the baby arks out with their own bathwater!



Slide  
139/140

To do is a tall order and will require many of us to change the way we operate and to form new partnerships or alliances for the benefit of IBDC and the islanders who depend on it.

Happily, such approaches are increasingly seen throughout the island world. But, it is only a start!

Suitability of islands as conservation areas of both biodiversity **and** ethnobiodiversity

Slide  
141/142

• Become party to relevant international biodiversity conservation initiatives

Protection, recording and application of indigenous knowledge about atoll biodiversity, along with good modern scientific knowledge



South Tarawa, Kiribati

Slide  
143/144

### OPPORTUNITIES

- Give more scholarships for environment and biodiversity-related studies, in addition to scholarships for law, accounting, economics, medicine, which, although important, increasingly separate us from and make us more ignorant of our dependence of and understanding of biodiversity.
- Protect our uninhabited offshore islands and mini-terrestrial and marine reserves (microparks)
- Take our leaders on fieldtrips to areas that have.
- Leran

### FUNDING PARTNERS (1991-2004)

- The University of the South Pacific, Suva, Fiji Islands
- Secretariat for the Pacific Environment (SPREP)
- Secretariat for the Pacific Community (SPC)
- South Pacific Regional Survey of Forest Genetic Resources (SPRIG)
- John and Catherine Macarthur Foundation
- TOTAL Fondation d'Entreprise Pour la biodiversité et la mer
- French Government Cultural Exchange Programme, French Embassy, Suva, Fiji Islands
- Food and Agricultural Organization of the UN (FAO)
- Coral Reef Initiative in the Pacific (CRISP)



## Attachment 6 – Storylines

### GROUP 1

**Theme:** Traditional Knowledge versus Scientific Research

**Setting:** Old versus New

**Story:** Scene 1

- a) In a village in which a grandfather is sharing his traditional knowledge to his grandson who is attending tertiary (USP). They are fishing and discussing.
- b) The grandson who is doing Environmental Science shares his scientific research to his grandfather also

Scene 2

Characters: Lecturer, grandson and community

In USP where the grandson discuss to his science lecturer about his grandfather's knowledge. This leads a group from USP to visit his village discussing this issue.

Scene 3

Community shares their point of view towards the messages/discussions heard

### GROUP 2

Attitude

- Disaster an act of God = community
- Climate change is real = science (Scientist going to the community)

Points to note:

- Scientific/Community Awareness workshop conducted by IAS/USP in the Solomons.  
Deeply religious group or sect, their thinking.  
'God is responsible for all this adverse climate changes  
So do not worry about what will happen because no one can reverse or undo what God does

The IAS/USP awareness group can use the Bible; the story of creation, God gave us a perfect earth and told Adam to tend it (manage) but we throughout generation have mismanaged it (increase in greenhouse gases & pollutants)  
And since God will one day require of us on how we managed planet earth, it is high time to start managing it (earth) right.  
The IAS/USP team can continue on the awareness with understanding from the deeply religious group

Scene 1: Village Meeting  
Workshop Climate Change  
Finding (Environment Committee)

Scene 2: Village meeting

- Speakers from USP etc  
(facts)
- Scene 3: (Solution)  
To protect environment  
(agreement)

### **GROUP 3**

<b>Modern Society</b>	vs	<b>Old Society</b>
<ul style="list-style-type: none"> <li>- More pollution</li> <li>- increase in temperature</li> <li>- rise in sea level</li> <li>- more cyclones, soil erosion etc</li> <li>- resources are declining</li> </ul>		<ul style="list-style-type: none"> <li>- cleaner environment</li> <li>- less pollution</li> <li>- resources in abundance</li> <li>- good relationship between Humans and environment</li> </ul>

### **Drama**

- Scene 1: Old society; - fishing, planting, family. In a pollution free environment, Diversity ecosystem
- Scene 2: Businessman coming to persuade or to lure the villagers in selling all their Resource
- Scene 3: Effects of all the logging and overuse of resources

### **GROUP 4**

#### **CLOAK OF CULTURE**

- Scene 1 A boy is given a customary cloak symbolizing the land, the sea and the Sky. His father was given the same cloak when he was young now he gives it to his son. The father emphasizes that the cloak is symbolic also of their identity. The son must protect, respect and manage the resources wisely. The father throws a big feast to commemorate this passing on of the cloak of culture from one generation to the next.
- The son is indifferent, preferring he was given money instead of some cloak. He does not join the feast but goes to sleep instead. He dreams and Has three visions: (i) a warrior from the past, (ii) the present, (ii) the future
- Scene 2 Visions:
- (i) a warrior from the past  
Addresses the loss and change in land and sea. Loss of mangroves, trees, dirty and polluted water. Questions the type of people that live today. It seems people have no sense of identity because they have lost their natural resources.
- (ii) the present  
Three women are washing when a radio announces a cyclone warning.

One woman is prepared the other two mock her. The cyclone blows through their village followed by landslide and storm surge. The prepared Woman's house stands while the other two lose their families and belongings

(iii) the future

A news caster announces that another island has finally submerged due to increasing sea level rise. That brings to a total of three island countries within a span of 5 years. More loss of lives and displaced peoples looking for a place to live.

Scene 3

The young boy wakes from his dream in sweat and rushes to put on his Cloak of culture. He believes he has been warned by his dreams. Putting On his cloak he is determined to carry on the culture of resource management and heed the wise words of his father. He then challenges the audience to join him.

## Attachment 7 - Songs

### **SONG 1:**

All my fish are dying  
My forest destroyed  
The land is bare  
Nobody cares  
Food, pollution is everywhere

#### *Chorus*

Oh youth come  
Let us unite  
Fight to keep our environment tight  
This is the land  
Your future lies

.....

### **SONG 2:**

#### **What changes do we want**

1. With the changes  
There's always changes  
You just want to make them right  
Grow more trees and treat them right  
Make a place we all can like

#### **Chorus**

Always we should treat them right  
Old ways treat them right?

2. When there's logging  
There's landslides destruction  
There's nothing much we gain  
Despite the cash that we get from him  
It won't payback our loss  
(repeat chorus)

3. With the Old ways  
The only old ways  
There's much of food in store  
Now we suffering from modern lifestyle  
because we think we are right

4. With the changes  
There's always changes  
You just want to make them right  
Grow more trees and treat them right  
Make a place we all can like

#### *Chorus*

Old ways treat them right

5. Grow trees

Methods of farming & fishing  
When there's logging  
Here's landslides, destruction  
There's nothing much we gain  
Despite the cash we get from him  
It wont pay back our loss

6. Take care of resources in communities  
Keeping old knowledge explore the new  
Changes are always good  
Changes can happen
- 

**SONG 3: Tradition**

1. Olden days and modern time  
Climate change when they described  
For us to see  
Differences and similarities
  2. Olden days observation  
Myth and histories  
Colorful and fruits  
With beauties of our nature
  3. So let the world, come to realise  
Climate change is on the rise  
Which way we are going to take  
And decide
-

## **Attachment 8: Results of Community Risk Assessment**

### **GROUP 1 - HISTORICAL PROFILE of Muaivuso;**

#### **Group members:**

Meli, Niko, Merari, Tevita, Viliame, Mosese, Viliame, Rister, Morena

#### **Questions**

History of the village

- Mataqali Na Tabuivalu
  - Tree – bua
  - Bird – kula
  - Fish – guru
  - Seaweed – Dairo
- Originally from Naitasiri
- Used to be known for their yaqona ceremony and meke
- First harvest from crops distributed to chief and church

May – August: season for octopus (kuita), salala (fish)

---

#### **Problems faced:**

#### **Group members:**

Meli, Niko, Merari, Tevita, Viliame, Mosese, Viliame, Rister, Morena

A)

- Less 'bua' (frangipani)
- Kula habitat is 'Drala' tree has been cut down, therefore there is less/no 'kula'
- 1952
  - \* Earthquake brought guru (fish)
  - \* Hurricane
  - \* Tidal wave (created habitats)Many factors, destructive fishing, pollution (land & sea) cause the Guru population to decrease
- Dairo before was only for subsistence purpose. Now, less dairo found because most have been taken and sold out (cash)

B)

Ties between clans have weakened  
Knowledge of traditional values lesser e.g. Yaqona ceremonies/meke and Sevu – hardly practiced nowadays

C)

Before: Seasonal

Now: not many kuita/salala

Probably due: change in climate (rain season), pollution, building of road

Development: road has brought about a lot of changes, advantages & disadvantages, changes in culture

---

Meli, Morena, Niko, Rister, Alesi

---

Management Action Plan

LEQA/KAUWAI	REVUREVU	WALI NI LEQA	TABANA VEIVUKE	GAUNA Time
Problems/Issues	Effects	Solution	Who can help	
Vakarau vakavanua	Talaidredre Qavuqavu	Dua na progam ni veituberi	T/vanua B/Vakoro	2006

**GROUP 2 - Ranking Team**

- Earthquake – Tsunami – Major Disaster 1953

- 1) Landslides: Cutting down of trees and caterpillars  
Loosening the soil by digging/rain washes away sediments  
Therefore plants die as well
- 2) Over hunting of fishes: The banning of fishing grounds has caused the re-emergence of lost of species of fishes
- 3) Outbreak of diseases; Lack of proper water systems causing villagers to resort to river water which causes diarrhea and skin diseases
- 4) Tropical cycone; causes damages to village houses, plantation and affects water source
- 5) climate change; The change in climate causes difficulties amongst the villagers in adapting to the increase or decrease of temperature which leads to sickness e.g. headaches
- 6) Rubbish/Pollution: Increase in rubbish, oil spills, sewerage and wreackage from old ships causes water pollution which affects the marine life

Group members

Sam  
Kartik  
Emma  
Alesi

PROBLEM	EFFECTS	SOLUTION	WHO	TIME
1. Loss of resources	1. Loss of identity - Loss of culture - Loss of food security	1. replant 2. educate 3. MPA	1. community youth 2. NGOS	Immediate
2. Development	Change in culture	Revive culture	Elders in community	Now



### **GROUP 3 - TRANSECT Team**

#### 1. Upland Area

Some mountains

Some trees

- dakua
- damanu
- mavota
- buabua
- yaka
- yasi

#### 2. Types of soil

- red soil
- black soil
- swamp soil

#### 3. Lowland area

- mangrove
- dabi
- sinu
- vesi dina
- vesi wai
- lawere
- vutu wai
- vadra
- dilo

#### 4. Resources at sea

- lase/coral
- fish.ika
- inverts/sasalu
- sea weeds/vutia
- sand/nuku

#### 5. Area at risk for flooding

- Veisari Area
- Muaivuso Road
- Uciwai lalai/small creek
- heavy flooding area

Group members

Jolame, Komal, Joseph, Kalpana, Puren, Josaia, Viliame, Leone, Don, Tiri

---

<b>PROBLEMS</b>	<b>HOW TO SOLVE THE PROBLEM</b>	<b>WHO TO SOLVE THE PROBLEM</b>	<b>TIME</b>
1. creek flooding	Clean all the creek channel	Community	immediately
2. main flooding area (veisari)	Proper drainage in the river mouth	* Provisional members * Community leaders * Govt. ngos, youth	Immediately
3. poaching	Make awareness on benefits of MPA – (using posters) in related – marine resource management through drama	* Community leaders * MPA monitors * Relevant information sectors	Immediatley NOW

**Group members:**

Jolame  
Leone  
Puren  
Viliame  
Josaia  
Tiri  
Joe