APN CAPaBLE

- Making a Difference –

Scientific Capacity Building & Enhancement for Sustainable Development in Developing Countries

Training Institute on Climate and Extreme Events in the Pacific

Final Report for APN CAPaBLE Project:
2005-CB04CMY-Koshy
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Training Institute on Climate and Extreme Events in the Pacific

2005-CB04CMY-Koshy

Final Report submitted to APN

www.apn-gcr.org

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Overview of Project Work and Outcomes

Non-Technical Summary

A three-year APN CAPaBLE funded project on *Pacific Islands Training Institute on Climate and Extreme Events* was conducted as a collaborative effort combining the expertise, assets and capabilities of the University of the South Pacific (USP), the East-West Center (EWC) and the New Zealand National Institute of Water and Atmospheric Research (NIWA). Additional financial and in-kind support for the Training Institute was provided by the U.S. National Oceanic and Atmospheric Administration (NOAA), EWC, NIWA and USP and a host of other regional and international organizations.

The overarching goal of the Training Institute (extended workshop) was to enhance the regional network of scientists, forecasters, disaster management officials, sectoral field workers and resource managers to enhance the capacity of Pacific Island jurisdictions to understand, anticipate and effectively respond to the consequences of current and future patterns of climate variability and climate-related extreme events such as droughts, floods and tropical cyclones both today and in the future.

Each workshop was designed to be an intensive, two-week program of lectures, hands-on experience with climate forecasting and risk assessment tools, small group discussions, media training, and shared exploration of adaptation and mitigation policy options, and a role play to put into practice the skills developed during the workshop.

About 30 participants form eleven Pacific island Countries participated in the inaugural Training in Suva (2004). This was followed by two in-country training in Samoa (2005) and Kiribati (2006), both attended by about 35 participants representing a wide spectrum of stakeholders, including government, community and other non-state actors.

The feedbacks, both direct and indirect, revealed that the training was well conceived, planned and delivered to suit the regional and national capacity needs of the countries concerned to address the implications of current and future climatic impacts, the resulting vulnerability and adaptation implementation.

Objectives

The overarching goal of the Training Institute project was to enhance the regional network of scientists, forecasters, disaster management officials and resource managers skilled in the development and use of climate information to increase the resilience of Pacific Island nations in the face of climate-related extreme events.

In addition, the Training Institute was also designed to achieve the following learning

objectives:

Increased understanding of the consequences of climate variability and change on communities, businesses and natural resources in the Pacific Islands with a specific emphasis on climate-related extreme events such as droughts, floods, tropical cyclones and high temperatures; Increased awareness of and familiarity with available climate forecasting and assessment tools and information services, including forecasts of the El Niño-Southern Oscillation (ENSO) cycle;
Enhanced understanding of current and potential applications of these tools to reduce climate vulnerability in key sectors, including disaster management, water resources, public health, agriculture, tourism, fisheries and coastal resource management; and Exploration of the challenges and opportunities associated with the integration of climate information to support economic development and community planning in the Pacific.

Amount Received and Number of Years Supported

The three-year project was funded as follows:

US$ 49 968 for Year 1 - (2004)

US$ 48 000 for Year 2 - (2005)

US$ 50 000 for Year 3 - (2006)*

(*NB: 20% or US$10 000 of Year 3 budget is yet to be transferred to us)

Note: This project also received financial and in-kind contributions from other sources:
NOAA: US$23 000

In-kind contributions from: USP, NIWA and East-West Centre

Work Undertaken

1. Fiji Climate and Extreme Events Training Institute, USP, Suva, 15 – 26 June, 2004.

2. Samoa Climate and Extreme Events Training Institute, SPREP, Apia, 10 – 20 May, 2005.

3. Kiribati Climate and Extreme Events Training Institute, Otintaai & Teuanete Conference Centre, Tarawa, July 21 – August 2, 2006.

Results

The first phase of the Training Institute project comprised an intensive, two-week Training Institute conducted on the campus of the University of the South Pacific in

Suva, Fiji held in June 2004. Nineteen participants from eleven Pacific Island countries were chosen for financial support through a competitive selection process with additional participation from a number of qualified individuals from Fiji. These participants represented national meteorological services, a variety of government ministries addressing water resource management, agriculture, forestry and fisheries, disaster management, environmental management and conservation and a number of education and scientific institutions throughout the region. Through lectures, hand-on experience with climate forecasting and risk assessment tools, small group discussions, media training, and shared exploration of adaptation and mitigation policy options, the Training Institute achieved the following *learning objectives:*

Increased understanding of the consequences of climate variability and change on communities, businesses and natural resources in the Pacific Islands with a specific emphasis on climate-related extreme events such as droughts, floods, tropical cyclones and high temperatures; Increased awareness of and familiarity with available climate forecasting and assessment tools and information services, including forecasts of the El Niño-Southern Oscillation (ENSO) cycle;
Enhanced understanding of current and potential applications of these tools to reduce climate vulnerability in key sectors, including disaster management, water resources, public health, agriculture, tourism, fisheries and coastal resource management; and exploration of the challenges and opportunities associated with the integration of climate information to support economic development and community planning in the Pacific.

Phase two of the project involved the development and testing of a modular, in-country training program that could be implemented throughout Oceania. The Samoa Training Institute, held in May 2005, provided the first in-country demonstration of the Pacific Islands Training Institute learning objectives, approach, methodology and materials. Participants in the Samoa Training Institute represented the ministries, scientific agencies, public officials, NGOs and public officials who serve as members of the Samoa national climate change country team as well as representatives of the media and other interested individuals and institutions. In addition to developing local capacity to understand, anticipate and prepare for climate-related extreme events, the Samoa Training Institute provided an opportunity for the Samoa climate change country team to explore opportunities to mainstream information about climate variability and change into national climate change adaptation programs and long-term sustainable development planning.

The Kiribati Training Institute, the second and final in-country training, represented a significant step towards enhancing both national and regional capacity to enhance their resilience to climate-related extreme events.

The seven major thematic areas covered during the training in Kiribati were: understanding the science of climate change and climate variability; forecasting climate; climate change impacts and vulnerability and assessment (V&A) tools: the TrainClim model; climate V&A methodologies and traditional knowledge; mainstreaming adaptation; awareness and the role of media in disseminating climate information; and practical training on application and use of climate change

information through a role play simulation exercise.

The immediate impacts on Kiribati from climate change were through El Niño and La Nina climate phenomena (ENSO). During El Niño, Kiribati tends to receive higher than normal rainfall (heavy rains) and during La Nina, Kiribati tends to receive lower than normal rainfall (dry weather conditions).

The Kiribati training, in addition to sessions on the science of climate change and the use of tools and models, also had practical hands-on sessions whereby climate change impacts on the four major sectors - water, agriculture, fisheries and coasts - were discussed, and adaptation and mitigation measures were compiled.

Small island developing states, including those in the Pacific, are considered among the most vulnerable to the consequences of climate variability and change and associated extremes:

The Pacific training institutes revealed that while the integration of climate information into decision-making is clearly an exciting opportunity, there are a number of scientific, technical, and communications challenges that can make the realization of those opportunities difficult. One of the most pressing of those challenges is the need for education and training programs designed to significantly enhance the cadre of skilled individuals in the Pacific Islands familiar with the development and application of climate forecasts and assessment information in key sectors.

Training Institute Products: A number of useful workshop products have been produced: (i) a two-volume Resource Booklet. Part 1 of the Resource Booklet included a description of the Training Institute background, objectives and focus along with the Training Syllabus and abstracts for each of the major presentations or exercises conducted as part of the Training Institute. Part 2 of the Booklet contained the Required Readings for the Training Institute. The contents of the two-volume Resource Booklet along with additional readings, presentations, exercises and associated materials were provided to participants on CDs and this can also be cited at the PACE - SD website: (www.usp.ac.fj/pace).

All of the resource materials for the Training in Samoa and Kiribati were provided in two CDs. The first CD was given to participants at registration and contained background information, recommended readings, the Training Institute Syllabus and an initial list of participants and resource people. At the end of the Training Institute, participants received a second CD that contained copies of PowerPoint presentations and exercises, the Training Institute Director's detailed daily notes, the Final Syllabus and a final list of participants and resource people. In the Kiribati training participants were also given copies of the TrainClim software for practice.

Relevance to the APN CAPaBLE Programme and its Objectives

The three main objectives of the CAPaBLE program relate to improved science-policy interactions, capacity enhancement of leading researchers in the area of climate change

vulnerability and adaptation implementation and capacity building of aspiring scientists in the target areas of climate change and its impacts on water and food security. The Pacific Climate Training Institute contributed directly to two of the above three objectives:

Capacity building through sharing of knowledge, experience, scientific information on climate change impacts, vulnerabilities, adaptation and mitigation; and, through the dialogue initiated at the Training Institute,

Improvement of informed decision-making in developing countries by dissemination of the outcomes of research activities to policy-makers and civil society.

Self Evaluation

From our perspective as co-directors, the Pacific Islands Training Institute on Climate and Extreme Events exceeded our highest expectations. The passion, enthusiasm and wisdom shown by participants and resource people alike created a high-energy atmosphere that inspired all of us. The insights during the two weeks of work together advanced our individual and shared understanding of how and why changes in climate matter to Pacific Island communities. We have developed a number of specific ideas for future research, education and capacity-building activities and we are actively engaged in pursuing several of those ideas. Perhaps most importantly, the Training Institute has created a new regional network of individuals and institutions who are dedicated to working together to enhance the resilience of Pacific Island nations in the face of climate-related extreme events such as droughts, floods and tropical cyclones, and the mainstreaming of climate information to their local communities.

The workshops also helped promote the whole idea of 'train the trainer' concept into reality both in Samoa and Kiribati. Strong bonds of professional collaboration and friendship were forged during the two weeks spent together and the countries and the world will benefit from the contributions of the Samoa and Kiribati Climate Change Country Team that emerged from the Training Institute. Both teams will play key roles in the climate adaptation projects in country.

Potential for Further Work

The three training institutes have been successful in building capacity in its broadest sense, at the individual, institutional and systemic levels. The in-country trainings have been particularly useful in this sense. But the drawback was that so far we have been able to reach out to only to two of the many Pacific island countries. It is important that these trainings need to be given to as many of the countries as possible in the near future.

In addition, it is important to link the economic implications of Climatic extremes using economic tools currently available in future trainings. This will enable the

disaster managers to plan cost effective and proactive adaptation options. These adaptation activities must be closely linked to national adaptation programme of action (NAPAs) and also national sustainable development strategies.

Publications

Summaries of the Training Institutes' reports were published in the Oceanic Waves, a quarterly newsletter published by the START-Oceania Secretariat.

Pacific Regional Training Institute Climate Extreme Events, 2004. Oceanic Waves, Volume 6, Issues 3&4, October 2004 (www.usp.ac.fj/start/)

Samoa Training Institute Climate Extreme Events, 2005. Oceanic Waves, Volume 7, Issue 2, May 2005, (www.usp.ac.fj/start/)

Kiribati Training Institute Climate Extreme Events, 2006. Oceanic Waves, Volume 8, Issue 3, September 2007, (www.usp.ac.fj/start/)

News Paper articles in Fiji, Samoa and Kiribati

Acknowledgments

We would like to acknowledge the collaborative effort and dedication of the following local, regional, international organisations, and institutions, government agencies:
The University of the South Pacific (USP), the East-West Centre (EWC) and the New Zealand National Institute of Water and Atmospheric Research (NIWA), U.S. National Oceanic and Atmospheric Administration (NOAA), and APN for their financial contributions and support. Not to forget the in-kind support in the form of time and materials were provided by resource people from a number of scientific and educational institutions throughout the Pacific including the three organizing institutions as well as: the South Pacific Applied Geosciences Commission (SOPAC): the Pacific Regional Environment Programme (SPREP); Australian Marine Science and Technology (AMSAT); the Fiji Meteorological Services (FMS); Ministry of Natural Resources, Environment and Meteorology (MNREM) of the Government of Samoa, the Ministry for Environment, Land and Agriculture Development (MELAD) of the Government of Kiribati, the Australia Bureau of Meteorology (BoM); the Australia Commonwealth Scientific and Industrial Research Organization (CSIRO); the University of Auckland; the International Research Institute for Climate Prediction of Columbia University in the United States of America (IRI); the Pacific ENSO Applications Center (PEAC), National Meteorological and Hydrological Services (NMHSs) throughout Oceania, the World Meteorological Organization (WMO) Sub-regional office for the South West Pacific (WMO SRO), the international Global Change Institute (IGCI), University of Waikato, and other collaborators in the Asia-Pacific region. Without their financial and in-kind support this particular climate and extreme events training institute may not end up as successful and fruitful in the end.

Technical Report

1.0 Abstract

The overarching goal of the Training Institute project was to enhance the regional network of scientists, forecasters, disaster management officials and resource managers skilled in the development and use of climate information to increase the resilience of Pacific Island nations in the face of climate-related extreme events. Through an intensive, two-week program of lectures, hands-on experience with climate forecasting and risk assessment tools, small group discussions, media training, and shared exploration of adaptation and mitigation policy options, the Institute achieved all its objectives as attested by the participants and our self evaluation.

In this context, the Training Institute contributed directly to two of the three objectives of the APN CAPaBLE program:

- *Capacity building through sharing of knowledge, experience, scientific information* on climate change impacts, vulnerabilities, adaptation and mitigation; and, through the dialogue initiated at the Training Institute,
- *Improvement of informed decision-making in developing countries by dissemination of the outcomes of research* activities to policy-makers and civil society.

The Training Institute was developed as a collaborative effort combining the expertise, assets and capabilities of the University of the South Pacific (USP), the East-West Center (EWC) and the New Zealand National Institute of Water and Atmospheric Research (NIWA). Additional financial and in-kind support for the Training Institute was provided by the U.S. National Oceanic and Atmospheric Administration (NOAA), EWC, NIWA and USP and a host of regional and international organisations and scientists.

Overall about 100 participants received training during the three two-week training which is a great achievement in this region. This pool will be able to contribute substantially to the national local awareness building and climate planning and adaptation activities as part of NAPAs, regional climate projects such as PACC (Pacific Adaptation to Climate Change) and general sustainable development initiatives.

A summary of the latest training in Kiribati is given below as an example of the overall training within the three-climate training. The syllabus was divided into seven thematic areas as follows:

1. *Understanding the Science of Climate Change and Climate Variability:* the pacific climate system, Scientific aspects of the ENSO related inter-annual variability in the south pacific, enhanced greenhouse effect and global warming, Impacts of Climate Variability and Change: a global /regional perspective, Introduction to the local climatology of Kiribati and the main features of seasonal to inter-

annual variability as experienced in Kiribati, Consequences of Climate Variability and Change for Kiribati.

2. Forecasting Climate: High-Resolution Climate Simulation for Pacific Island Countries: Needs and Prospects, Seasonal Climate Prediction in the Pacific, Seasonal Climate Prediction, Tools and Techniques, Seasonal Climate Prediction in Kiribati: Current Activities and Future Plans, Introduction to Seasonal Forecasting Tools and Techniques.

3. Climate Change Impacts and V&A Tools: the TrainClim Model: Introduction and orientation to the model, Climate change scenarios, local sea level scenarios, Water tank model, DEMO with SIMCLIM: Aitutaki case study, Flooding & Climate change, Vulnerabilities and Adaptation Assessment tools, Storm surge flooding & Cost benefit analysis, Impact models – coast, agriculture, water and Health.

4. Climate V&A Methodologies and Traditional Knowledge: Climate Change V&A Methodologies, Climate Variability and Change Vulnerability Assessment and Adaptation Tools, Integrating Traditional Knowledge and Practices.

5. Mainstreaming adaptation: Introducing Mainstreaming Climate Information, Aspects of mainstreaming through Kiribati Adaptation, Brainstorming and Discussion on current and future plans of KAP (Kiribati Adaptation Program) mainstreaming activities, International and Regional Cooperation in assisting adaptation, Mainstreaming Climate Change: Sectoral Approach.

6. Awareness and Role of Media in disseminating Climate information: Improving Communications between Users and Providers of Climate Information: The Role of the Media, Introduction to Media Training Exercises: Effective Press Releases, Media Training Exercises: Effective Press Releases and Radio Interviews.

7. Practical training on application and use of Climate Science information e.g., "Rains of Tomorrow"**:** Preview of Coming Attractions: THE RAINS OF TOMORROW, THE RAINS OF TOMORROW- drama begins.

2.0 Introduction

Small Island Developing States (SIDS), including those in the Pacific region are considered among the most vulnerable to the vagaries of climate variability, change and other associated extremes:

- Year-to-year variability such as ENSO has significant consequences for Pacific Island nations;
- Economic plans for most Pacific Island nations are dependent on climate-sensitive sectors (e.g., agriculture and tourism) and resources (e.g., coral reefs);
- Water resources are already stressed in many jurisdictions and many low-lying atoll nations are totally dependent on rainfall; and

- Climate-related extreme events such as droughts, floods, tropical cyclones and high temperatures already present significant challenges to public safety and community infrastructure.

According to the 2002 World Disaster Report, the International Federation of Red Cross and Red Crescent Societies, the number of people in the wider Pacific region affected by weather-related disasters has increased from 1.2 million to 18 million over the past 30 years. Droughts make up one of the largest components of such disasters, and the experiences during the 1997-1998 El Niño event highlights the significant consequences that such climate-related extreme events can have for Pacific Island countries. Increasingly, the disaster management community and development organizations like UNDP, ADB, the World Bank and national development agencies are recognizing the importance of managing climate risk as an essential element of comprehensive emergency management programmes and development planning. The potential economic benefits of proactive planning through climate adaptation were reflected in a recent Munich-Re analysis suggesting that the projected costs of damage inflicted by climate change could reach or exceed $300 billion per year.

More recently in Fiji a tropical depression devastated parts of Fiji on the eve of Easter causing devastating floods in Rewa/Navua/Serua. The Fiji Disaster Management committee (DISMAC) confirmed 11 deaths, 9 missing and $F5.6 million damage bill from the above inclement weather incidents. With recovery and rehabilitation, this figure may even go much higher than these estimates. Cyclone Heta caused severe damage in five countries; American Samoa, Cook Islands, Niue, Samoa and Tonga earlier this year.

According to recent studies done on supercomputers at the Commerce Department's Geophysical Fluid Dynamics Laboratory in Princeton, N.J, Global warming is likely to produce a significant increase in the intensity and rainfall of hurricanes/cyclones in coming decades. This most comprehensive computer analysis done so far reveals that by the 2080's, seas warmed by rising atmospheric concentrations of heat-trapping greenhouse gases could cause a typical hurricane to intensify about an extra half step on the five-step scale of destructive power, says the study, And rainfall up to 60 miles from the core would be nearly 20 percent more intense.

Against this backdrop and drawing on a February 2001 Training Institute on Climate and Extreme Events in the Asia-Pacific Region supported by APN, START and the U.S. National Oceanic and Atmospheric Administration (APN project 2000-03), the Pacific Islands Training Institute on Climate and Extreme Events was designed to create a regional network of scientists, decision makers and institutions skilled in the use of climate information and services to support practical decision-making in key sectors such as agriculture, water resource management, public health and safety, tourism and community planning and resource development.

The Training Institute on Climate and Extreme Events in the Pacific represents a three-year project (2004 – 2006) were designed to create a regional network of scientists, decision makers and institutions skilled in the use of climate information and services to support practical decision-making in key sectors such as agriculture, water resource

management, public health and safety, tourism and community planning, and resource development within the Pacific island countries region.

3.0 Training Outputs

The main output and the overall outcome of the training was a pool of climate trained participants whose awareness, knowledge, understanding general capacity underwent transformative changes to enable them to take up leadership roles in their respective spheres of action. Given below is a brief description of each of the Training Institutes to show the way in which this was achieved.

3.1 Fiji Climate and Extreme Events Training Institute - 2004

Opening Ceremonies on 15 June 2004 included a keynote address by the Honourable Joji Natadra Banuve, Assistant Minister for Local Government, Housing, Squatter Settlement and Environment of the Government of Fiji as well as opening remarks by Mr. Hugh Neighbours, Chargé-d-Affaires of the U.S. Embassy and welcome by Professor Konai Thaman, acting vice-chancellor - USP, and statements from the Institute coordinators from USP, EWC and NIWA. the Participants (*Appendix 1:* list of participants and resource persons) then briefly introduced themselves and shared their expectations and agreed that at the end of the two weeks, Training Institute organizers and participants will evaluate if both the formal Training Institute objectives and these individual expectations had been met.

The first two days of the Training Institute were dedicated to lecture presentations designed to provide an overview of the state of scientific understanding of the nature and consequences of climate variability and change in the Pacific. Following this overview, participants were introduced to the underlying principles of seasonal-to-interannual climate forecasting and they were provided with an opportunity for hands-on experience with state-of-the-art climate forecasting tools and techniques.

Presentations and group discussions then focused on the challenges and opportunities associated with establishing the science-user partnerships required to move from climate forecasting to applications with sessions focused on topics such as integrating traditional knowledge and practices, regional experience in the development and use of climate forecasts and an extensive exploration of improving communications between the users and providers of climate information. This latter portion of the programme included an exciting opportunity to increase their understanding of the special role of the media and enhance their individual media communication skills through videotaped interviews conducted by experts including Kay Gregory from One News Television in New Zealand and Jan Sinclair from the University of Auckland, an expert in print media communications.

The second week of the Training Institute began with a field trip to local areas recently affected by heavy rains and flooding as well as study sites supporting the GEF/START/TWAS funded AIACC project entitled *"Integrated Methods and Models for Assessing Coastal Vulnerability and Adaptation to Climate Change in Pacific Island Countries"*. Participants were then introduced to a number of tools and techniques available for

climate vulnerability and adaptation assessments as well as the CHARM comprehensive risk management framework. Plenary presentations and discussions then focused on the practical meaning of climate adaptation mainstreaming and risk management in the Pacific.

The final session of the Training Institute comprised a role-playing exercise in which participants explored the challenges and opportunities associated with the development and use of climate information to support decision-making in a fictitious Pacific Island country. This Training Institute practicum provided an opportunity for participants to apply the lessons they had learned during their two weeks together. Consistent with CAPaBLE program's focus on continued capacity building, the closing sessions of the Training Institute included a discussion of scientific, education and public policy projects that could be undertaken either individually or jointly by participants, organizers and other partners in the region.

The Final Syllabus for the Training Institute is included as *Appendix 2* to this report and a summary of issues raised and evaluation comments by participants in *Appendix 3*.

3.2 Samoa Climate and Extreme Events Training Institute - 2005

Opening Ceremonies on May 10 2005 began with a prayer by Pastor Elekosi Viliamu, Aleisa Congregation Christian Church of Samoa (CCCS), who reminded participants to take time to admire God's creation and remember that, like people on the Sabbath, the Earth, too, needs time for rest and replenishment. He urged participants to take action to reduce the pressure of exploitation on the Earth's resources and move towards a sustainable lifestyle that recognizes the importance and beauty of nature.

Almelo Ulu Kini, Minister of Police, Prisons, and Fire Services (and Acting Prime Minister) provided the Opening Keynote Address for the Training Institute noting the central importance of both education and adaptation to changing climate and other environmental conditions) to Samoa. The Minister reviewed some of the significant impacts of recent climate-related extreme events in Samoa such as Cyclones Ofa and Val as well as prolonged periods of drought during the 1982-83 and 1997-1998 El Niño events. The Minister highlighted the public health and safety challenges that extreme events pose and the importance of advance planning to save lives and limit losses. The Minister also noted Samoa's dependence on climate-sensitive economic sectors such as agriculture and fisheries. In this context, the Minister noted that

> "…in education and the use of scientific information from research, lies the key to enable us to make better decisions on how to utilize and invest in our resources."

The Minister closed his remarks by urging the participants to work together with the resource people over the two-week Training Institute so that they can use a better understanding of climate and extreme events to serve the people of Samoa by "making better policies and decisions that we may use as we strive to achieve a successful and sustainable future for Samoa."

John Adank, New Zealand High Commissioner to Samoa noted that the subject matter of the Training Institute is crucially important to the development and viability of the region and that this importance was reflected in the contributions of the many institutions and organizations that contributed to the Training Institute. Mr. Adank recalled his own recent experience with cyclone Ofa and noted that one of the biggest challenges facing the participants is communicating knowledge of climate-related extreme events to the public.

Andrea Volentras, Secretariat for the Pacific Regional Environment Programme (SPREP), provided welcoming remarks on behalf of the SPREP Director, Asterio Takesy and reinforced the importance of the goals and objectives of the Training Institute for both Samoa and the Pacific region as a whole.

Participants then briefly introduced themselves and shared their expectations and agreed that at the end of the two weeks, Training Institute organizers (*Appendix 4:* Full list of participants) and participants will evaluate if both the formal Training Institute objectives and these individual expectations had been met.

The first morning of the Training Institute was dedicated to lecture presentations designed to provide an overview of the state of scientific understanding of the nature and consequences of climate variability and change in the Pacific. Following this overview, participants were given a presentation on Samoa's climate by Dean Solofa of the Samoa Meteorology Division and engaged in a panel discussion of their experience with the impacts of climate variability and change in Samoa. Beginning in the late afternoon of Day 1 and continuing through Day 2, participants were introduced to the underlying principles of seasonal-to-interannual climate forecasting and provided with an opportunity for hands-on experience with state-of-the-art climate forecasting tools and techniques recently initiated by the Samoa Meteorology Division.

Following a discussion of seasonal forecast verification, presentations and group discussions then focused on the challenges and opportunities associated with establishing the science-user partnerships required to move from climate forecasting to applications with sessions focused on topics such as regional experience in the development and use of climate forecasts, integrating traditional knowledge and practices, and an extensive exploration of improving communications between the users and providers of climate information. This latter portion of the programme included an exciting opportunity to increase participants understanding of the special role of the media and enhance their individual media communication skills. This session of the Training Institute (comprising a day-and-half) was moderated by Kay Gregory from One News Television in New Zealand and Jan Sinclair from the University of Auckland and expert in print media communications. Participants engaged in individual and group exercises designed to enhance their skills in the development of news releases as well as radio and television interviews which continued into the morning of the fifth day.

Beginning in the late morning of Day 5 and running through Day 6, participants engaged in a role-playing exercise in which participants explored the challenges and

opportunities associated with the development and use of climate information to support decision-making in a fictitious Pacific Island country called Navigator Islands. This Training Institute practicum provided an opportunity for participants to apply the lessons they had learned during their first week together and allowed participants to strengthen their skills in the development, communication and use of seasonal climate forecasts. *Appendix 6* provides the introduction to the role-playing exercise known as THE RAINS OF TOMORROW.

On Day 7, the participants were introduced to the concept of mainstreaming climate information for adaptation. Through lectures and small-group exercises, the participants explored the challenges and opportunities associated with mainstreaming and outlined adaptation roadmaps in three key sectors: water and electricity; agriculture and fisheries. Following these exercises, participants engaged in a plenary discussion of education and outreach aspects of climate information mainstreaming and adaptation. Day 7 concluded with a presentation on state-of-the-art approaches to global and regional modeling.

Day 8 of the Training Institute focused on issues of vulnerability and adaptation beginning with morning lectures on vulnerability assessment tools and technologies from USP personnel and an introduction to community-based assessment and adaptation methodologies being implemented in Samoa. The lectures were followed by an afternoon field trip to explore the results of a community-based climate vulnerability and adaptation project in Saoluafata Village.

Day 9 began with a participant-led presentations and working group discussions of activities, plans and information needs of the Samoa Climate Change Country Team with particular attention to opportunities for cross-sectoral linkages. Participants were then provided with updates on a number of international climate and disaster management programs and activities including: the United Nations Framework Convention on Climate Change; the Intergovernmental Panel on Climate Change; the CHARM comprehensive hazards risk management tool developed by the South Pacific Applied Geosciences Commission (SOPAC); and the SOPAC-led Pacific regional water dialogue.

The morning of the final day of the Training Institute began with discussions of the important role that observations and long-term climate data play in understanding current conditions, assessing vulnerability and projecting future trends and conditions with specific presentations on the Pacific Islands Global Climate Observing System (PI-GCOS), the Pacific Islands Global Ocean Observing System (PI-GOOS), the Schools of the Pacific Rainfall Climate Experiment (SPaRCE) and APN's growing links to the Global Earth Observing System of Systems (GEOSS).

Consistent with CAPaBLE program's focus on continued capacity building, the closing sessions of the Training Institute included a discussion of scientific, education and public policy projects that could be undertaken either individually or jointly by participants, organizers and other partners in the region. Specifically, Linda Stevenson (APN) led a working session designed to provide guidance on writing effective proposals for APN and identifying possible topics for future proposals to

APN from Samoa. Some of the possible topics for future proposals to APN included:

- Increasing capacity building for seasonal forecast and other products including model development to enhance climate forecasting and climate change projections
- Reducing effects of climate variability on the community level
- Training communities to implement sustainable development (sustainability at a community level)
- Looking at the impacts of climate variability on subsistence sectors (fishing and agriculture) and the implications of forecasting skill/accuracy
- Exploring climate change adaptation measures
- Developing capability to forecast flash floods-improved capability to provide advanced forecasts of intense rainfall
- Impact of climate variability and change on fishery nursery areas with an eye toward finding good venues to move giant clam and oyster brood stocks to protect them from tropical cyclones
- Construction of structural adaptation options (e.g., seawalls)
- Public awareness and education programs for soft (non-structural) adaptation

Following lunch on the final day, Eileen Shea reviewed some of the insights and recommendations that had emerged during the Samoa Training Institute on Climate and Extreme Events. Closing remarks focused on maintaining the partnerships established during the Training Institute were provided by: Asterio Takesy, SPREP Director; Linda Stevenson, APN; Dean Solofa from the Samoa Meteorology Division, Eileen Shea on behalf of the Training Institute Directors and the Training Institute participants.

The Final Syllabus for the Samoa Training Institute on Climate and Extreme Events is included as *Appendix 5* to this report.

3.3 Kiribati Climate and Extreme Events Training Institute – 2006

The Kiribati Training Institute on Climate and Extreme Events (KTICEE) was opened with a welcome prayer by Father Albert. Mrs Tererei Abete-Reema (Director of Environment and Conservation Division) welcomed everyone to the training and thanked, especially, all the trainers for being there, describing their presence as a support and morale booster. He said, "In Kiribati, if an important function goes well, it means the spirit is with us."

Opening remarks were made by Professor Koshy, co-convener of the Training Institute. He explained that at the end of the Regional Pacific Island Training Institute on Climate and Extreme Events held in June 2004 in Suva, Fiji, a pool of resource people had been created to continue in –country training. Last year, such in-country training was held in Samoa and this year, it was being held in Kiribati. Small Island States are among the most vulnerable states in the world. This training institute was one of the Type II initiatives developed through partnerships after the World Summit in Johannesburg. This training Institute was a capacity building activity developed by USP, NIWA and

the East-West Center. Representatives of IGCI, SPREP and Australian Bureau of Meteorology were also present at this training. Unfortunately the other coordinators Ms Eileen Shea and Dr Jim Salinger could not attend the Kiribati training because of urgent prior commitments. This was a multi-disciplinary type of training which needed participants from various backgrounds. For in-country trainings, a network of resource people was needed. There was a need to continue capacity building and they also wanted to come up with materials that could be used in the future. The key resource person for KTICEE, Mr Riibeta Abeta, had attended the first training in Suva. Mr Dean Solofa from Samoa was also at the first training and he was in Kiribati as a resource person. This type of workshop could build capacity in dealing with climate change and extreme events in Kiribati.

Following Prof Koshy's comments, the resource people introduced themselves – Mr Dean Solofa, Prof Murari Lal, Dr Peter Kouwenhoven, Ms Janita Pahalad, Ms Ashmita Gosai, Ms Mosmi Bhim and Mr Melchior Mataki.

A keynote address was given by Hon. Natan Teewe, the Minister for Communications, Transport and Tourism Development. The following excerpts from Hon. Teewe's address highlighted the gravity of the problems of CC and EE for Kiribati:

"Global warming, climate change and sea level rise are realistic issues facing the whole world. For low lying island nations like Kiribati, their long-term sustainability as nations are questionable. Our contribution to the problem of global warming is minimal. However, despite that we have no choice, we are faced with the realities of climate change. If one goes around our shores, the extent of environment degradation is very noticeable. Coastal erosion has been extensive, even on the outer islands where there has been less man made structural changes.

"Our people have been complaining about accelerated erosion to our shores caused by frequent high tides. Questions have been raised in our Parliament asking for positive Government action to control the erosion problem. There is also a general feeling that the sea level has been rising and the analysis of the available data seems to confirm that feeling. Kiribati as a nation has been threatened. We as the people living in this country are also being threatened. Our vital natural resources like underground water, our food crops, and even our infrastructure, are also being threatened. Our livelihood is being threatened. It is very sad indeed, but what can we do? How significant is the part we play or will play in Kiribati to address and respond to the problems of climate change, if the privileged countries, the bigger countries just don't care? How many more times do we have to make noises at the UN and other international forums to put sense into the thinking process of our bigger brothers?

"The training will provide us with the tools, with which we can review and evaluate our existing practices, and to develop and formulate informed policies and strategies that may achieve changes to our existing practices. The contributions from every sector, government and otherwise, is required.

"Where our practices extend the problems related to Climate Change, government has the obligation to review, and where necessary, change the policies and strategies. However, will that be useful if the developed, industrialized countries do not want to cooperate?

In his keynote address, Hon. Teewe reiterated that government has the obligation to review, and where necessary, change the policies and strategies if it extends the problems related to climate change. However, Hon. Teewe was skeptical of the usefulness of these changes if the developed, industrialized countries did not want to cooperate. "The bulk of the causes for climate change and global warming come from the industrialized countries. That is of grave concern to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol who are challenging those countries to become more reasonable and considered. That is a major step in the effort to moderate and control the accelerated increase in concentrations of the major greenhouse gases in the atmosphere, which have already caused global warming and climate change," Hon. Teewe said. "We fully accept that for low lying island nations, the problem of climate change and variability must be addressed in a comprehensive manner, with all sectors of government and the communities contributing, as we strive to adapt to adverse impacts," Hon. Teewe said.

"The Government of Kiribati is taking this adaptation agenda seriously, and the adaptation measures have been integrated into the Government National Plan. The Kiribati Adaptation Project is taking the leading role in the long term planning, and supplementing it with shorter planning periods, through the National Adaptation Programme of Action. We appreciate the contributions of the World Bank and the UNDP to this important project," Hon. Teewe concluded.

During the morning session on Day 1, after the opening ceremony, the participants and the resource persons (*Appendix 7*) introduced themselves briefly explaining their affiliation, professional background, and their expectations of the training itself. This was followed by lecture presentations designed to provide an overview of the state of scientific understanding of the nature and consequences of climate variability and change in the Pacific**.** Ashmita Gosai, NIWA NZ gave a succinct presentation on the climate of the Pacific region, focusing mainly on the ENSO phenomenon and discussing the impact of El Nino on Kiribati (*Appendix 8:* full syllabus and programme). Following on Prof Lal set the scene for the understanding of the Pacific climate within the whole global climate system and addressed the challenges to creating the necessary climate scenarios both on a global scale using Global Circulation Models (GCMs) and Regional Circulation models (RCMs). He highlighted the current uncertainties in the scenario projections. This generated a lengthy discussion as to why after several years of research scientists are unable to give the correct scenarios based on which countries such as Kiribati, which one of the frontline countries to bear the brunt of CC impacts and resulting vulnerabilities. The participants were of the strong view that these uncertainties sent the wrong messages to the general public which make them dismissive of CC impacts and Governments slow down on response measures. The resource people clarified that in any scenario for the future, there is an element of uncertainty and the challenge is to make decisions within these uncertainties applying precautionary principles and prudent development strategies.

Prof. Koshy gave a presentation on the science of global warming and the signs of climate change (CC) as it applied to SIDS. The Kiribati Meteorological office gave an overview of the national climate system which was followed by presentations by national resource people on Kiribati coastal zone, water resources, and by the chamber

of commerce. These presentations were in i-Kiribati which resulted in some important discussions relating to the inadequacy if the vernacular language in capturing and translating the full meaning of a lot of technical language and terminologies used in CC area. Participants called for the development of a booklet on the glossary of CC and sought the help of USP for this purpose. USP offered to assist in whichever way possible to any effort from the participants.

The focus of Day 2 was climate forecasting. Prof Lal started the day with his presentation on a high resolution forecasting tool, C-CAM, and its applications for small island countries at such fine resolutions as 8x8 km, using a Fiji case study. This was followed by seasonal forecasting by Janita, Ashmita and Dean. In this context they introduced the product produced by the Pacific ENSO application Centre, and the Island Climate Update (ICU) coordinated by NIWA. They also participated in a forecasting game with a certain forecast and sectoral responses by participants and a final verification based on the actual climate of the season. Participants were concerned that while these products are useful in a general sense, they do not carry much Kiribati sensitive date and analysis and requested that PEAC pay attention to their need. Kiribati Meteorology Service gave an update of its current forecasting activities and future plans which included direct involvement in CC projects. They also highlighted the difficulties in providing local language forecasts because of the lack of adequate terminologies. The rest of the day the participants got involved in hands on activities using climate forecasting tools provided by Dean.

Day 3 and 4 were used mainly for the training on the use of the V&A training tool, TrainCLIM developed by IGCI. This session was conducted in the special computer lab that was set up at the meeting venue. There were several hands on training sessions marked: TRAINING 1: (100 min) Introduction, Climate change scenarios, local sea level scenarios, TRAINING 2: (45 min) Water tank model, TRAINING 3: (90 min) River flooding & Climate change, TRAINING 4: (100 min): Storm surge flooding & Cost benefit analysis, TRAINING 5: (45 min): Free exercise - *Objectives: Explore other options of TRAINCLIM (i.e. agriculture, freshwater lens or health)*

After the training sessions the participants were really impressed by the potential of the training version for improving their understanding of Climate V&A modeling and also to use the real time modeling version SimCLIM and wanted these models to be made available to them.

The day's programme was concluded by a session by Dean on Regional Monitoring Programmes: PI-GOOS and PI-GCOS. This presentation stressed the important role observations and long-term climate data play in understanding current conditions, assessing vulnerability and projecting future trends and conditions with specific presentations on the Pacific Islands Global Climate Observing System (PI-GCOS), the Pacific Islands Global Ocean Observing System (PI-GOOS), the Schools of the Pacific Rainfall Climate Experiment (SPaRCE) and APN's growing links to the Global Earth Observing System of Systems (GEOSS).

During the morning session of Day 5 the group discussed at length CC V&A methodologies and contextualized the importance of Traditional Knowledge and

practices used in Kiribati to deal with climatic extremes and disaster management in general. Prof. Koshy gave a presentation on the standard approach used by IPCC for V&A assessment and linked it to the latest Adaptation Policy Framework of UNDP and said win-win adaptations must be implemented as part of national development strategies. Prof. Lal demonstrated the use of the MAGICC- SCENGEN software to develop climate scenarios.

In the afternoon, there was an excellent presentation on traditional knowledge by Bwere Eritatia. His talk was titled, Integrating Traditional Knowledge and Practices in which he highlighted how the I-Kiribati use stars, clouds, waves, *buatons*, and birds as indicators of certain weather patters and take precautionary measures. They also used a special weather calendar prepared by traditional seasonal forecasters. Then the participants were divided into 4 groups for discussion and group presentations in the plenary at the end.

On day 6 the focus was on Climate Change mainstreaming. The participants were introduced to the concept of mainstreaming climate information for adaptation. Through lectures and small-group exercises, the participants explored the challenges and opportunities associated with mainstreaming and outlined adaptation roadmaps in three key sectors: water and electricity; agriculture and fisheries. Following these exercises, participants engaged in a plenary discussion of education and outreach aspects of climate information mainstreaming and adaptation.

Mataki gave a presentation on the general meaning and implications of mainstreaming followed by Prof Koshy on some of the actual pacific initiatives on CC mainstreaming. One of the resource persons, Dr Mary Jo Larsen's presentation addressed the themes through a three pillar approach – Conflict, Power structures and Analysis. In a CC mainstreaming approach, it is somewhat like the saying: "You cannot direct the winds, but you can adjust the sails."

Group discussions were held posing four questions: 1) How is climate integrated? 2) What works and what don't? 3) Any gaps in the mainstreaming process? 4) Recommendations? Each group addressed the questions from a policy, grassroots and technical approach.

This was followed by a presentation on the major Kiribati adaptation project, KAP, and a detailed discussion on the sectoral adaptation roadmap and group discussion, before the days programmes were concluded.

Day 7 was devoted entirely to media training -*Awareness and Role of Media on disseminating Climate information.* Bwatiri Bwataua, representative from Kiribati Media, moderated this session. The following presentations generated very lively discussions and participation in a mock radio interviews: (i) Improving Communications between Users and Providers of Climate Information (Kiribati Climate team, Mosmi Bhim, USP), (ii) Introduction to Media Training Exercises: Effective Press Releases (Mosmi Bhim, USP), (iii) Media Training Exercises: Effective Press Releases and Radio Interviews (Kiribati media, Mosmi Bhim) (iv) Media Training Exercises: Effective Press Releases and Radio Interviews Continued (Mosmi Bhim, Tiroia Tetabea, Kiribati media)

Day 8, as far as the participants were concerned, was the most interesting day when they took part in a *Practical training on application and use of Climate Science Information*

The programme was in the form of a role-playing exercise in which participants explored the challenges and opportunities associated with the development and use of climate information to support decision-making in a fictitious Pacific Island country called Navigator Islands. The role-play was an opportunity for participants to apply the lessons they had learned during their first week together and allowed participants to strengthen their skills in the development, communication, and use of seasonal climate forecasts. *Appendix 9* introduces the role-playing exercise known as THE RAINS OF TOMORROW.

On day 9 Prof. Koshy gave a summary of the Training workshop presentations matching them with the expectations expressed by the participants on the first day. Following this, all the participants gave their own evaluation of the training, which by any assessment would be rated as very positive and satisfying.

The KTICEE workshop closed with a keynote address by Hon. Martin Puta Tofinga, Minister for Environment, Lands and Agriculture Development, who was accompanied by his wife Mrs Katarina Tofinga. Hon. Puta highlighted the problems Kiribati faced due to climate change impacts and the efforts by their ministry to raise the plight of Kiribati at international environmental meetings. Hon Tofinga had been visiting his home island during the workshop, however, rushed back in time for the closing he said. Hon. Tofinga thanked workshop implementers for the training, which would assist various departments in preparing to deal with the impacts of climate change. Mrs Katarina Tofinga presented certificates to the 24 participants that successfully completed the training.

Consistent with CAPaBLE program's focus on continued capacity building, the closing sessions of the Training Institute included a discussion of scientific, education and public policy projects that could be undertaken either individually or jointly by participants, organizers and other partners in the region.

4.0 APN-Funded Participants

4.1 Fiji Climate and Extreme Events Training Institute - 2004

Nineteen participants from eleven Pacific Island countries were chosen for APN financial support through a competitive selection process with additional participation from a number of qualified individuals from Fiji, (the participant from Solomon Islands could not attend the training due to unexpected official commitment last minute). Please see *(Appendix 1)* for the Participants list. The Training Institute venue at the University of the South Pacific-Suva provided an opportunity for additional participants from the University of the South Pacific, the Fiji Meteorological Service, Fiji Sugarcane Research Centre, FSC Ltd.; SOPAC, AMSAT and National Disaster Management (NDMO) of the Fiji Ministry of Home Affairs. The Training Institute participants represented national meteorological services, a variety of government ministries addressing climate sensitive sectors such as water resource management,

agriculture, forestry and fisheries, disaster management, environmental management and conservation and a number of education and scientific institutions throughout the region.

4.2 Samoa Climate and Extreme Events Training Institute – 2005

Participants in the May 2005 Samoa Training Institute represented the ministries, scientific agencies, public officials, NGOs and public officials who serve as members of the Samoa national climate change country team as well as representatives of the media and other interested individuals and institutions. Please see *(Appendix 4)* for a list of Samoa Training Institute participants and resource personnel.

4.3 Kiribati Climate and Extreme Events Training Institute – 2006

Twenty four participants *(Appendix 7)* from various government ministries and departments, NGOs, and local Media within Kiribati had successfully completed the Climate and Extreme Events training Institute – 2006, which was held in Tarawa under APN financial contributions and support.

5.0 Conclusions

The successful implementation of the Climate and Extreme Events Training Institute in the Pacific in Fiji (2004), Samoa (2005), and Kiribati (2006) respectively clearly addressed the need to create a regional network of scientists, decision makers and institutions skilled in the use of climate information and services to support practical decision-making in key sectors such as agriculture, water resource management, public health and safety, tourism and community planning, and resource development within the Pacific island countries region. Clearly much more work needs to be done in more countries, involving more national level stakeholder involvement.

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Appendices

Appendix 1: Regional Training(Fiji) Participants & Resource Persons - 2004

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Appendix 2. Workshop Programme - 2004

Pacific Island Training Institute on Climate and Extreme Events
The University of the South Pacific
Suva, Fiji Islands

15-26 June, 2004

DAY 1: Tuesday, 15 June.

0800 – 1030 OPENING CEREMONY

Prayer: Ven. Rev. Apimeleki Qilio

Traditional Fijian Kava Ceremony

Welcome: Professor Konai Thaman, Vice- Chancellor (Actg), USP.

Keynote Speaker: Hon. JOJI NATADRA BANUVE, Assistant Minister for Local Government, Housing, Squatter Settlement & Environment, Government of Fiji

Opening Remarks

Dr Kanayathu Koshy, USP PACE-SD
Dr Candyce Clark, NOAA Office of Global Programs
Mr. Hugh Neighbour, Charge d'Affaires, US Embassy, Fiji
Dr. Howard Diamond, NOAA GCOS Office
Dr. Russell Howorth, SOPAC

GROUP PHOTO

1030 – 1100 MORNING TEA

Cocktail: All the participants and guests are invited to a cocktail at USP Bistro (Lower Campus/MSP), 6.30 p.m. TODAY, TUESDAY 15 June 2004

Pacific Island Training Institute on Climate and Extreme Events
The University of the South Pacific
Suva, Fiji Islands

15-26 June, 2004

DAY 1: Tuesday, 15 June.

0800 – 1030 OPENING CEREMONY

Traditional Fijian Kava Ceremony

Welcome, Prof. Konai Thaman, Acting Deputy Vice-Chancellor, University of the South Pacific
Keynote Speaker, Hon. Jioji Natadra Banuve, Assistant Minister for Local Government, Housing, Squatter Settlement & Environment of Fiji

Opening Remarks
Dr Kanayathu Koshy, USP PACE-SD (representing Institute Co-Directors
US Ambassador Representative, Fiji
Regional Organizations (CROP rep, Dr Russell Howorth)

GROUP PHOTO

1030 – 1100 MORNING TEA

1100 – 1240 INTRODUCTIONS
Institute Director moderates a session during which each participant provides a brief introduction to himself/herself and their expectations (approximately 3-5 minutes each).

The Training Institute - Ms Eileen Shea, East West Center, Hawaii

1300 – 1400 LUNCH

1400 – 1440 The Pacific Climate System – Dr Jim Salinger, NIWA, NZ
An introduction to the key features driving the climate and weather of the Pacific region.

1440 – 1510 The Impacts of climate extremes on Pacific Islands – Ms Eileen Shea, East West Center, Hawaii

1510 – 1525 AFTERNOON TEA

1525 – 1555 The El Niño/Southern Oscillation (ENSO) – Ms Ashmita Gosai, NIWA, NZ

1555 – 1625 An overview of present and future climate variability in the Pacific - Prof. Murari Lal, USP, Fiji

1625 – 1655 The United Nations Framework Convention on Climate Change – Mr Penehuro Fatu Lefale, NIWA, NZ

1655 – 1725 Climate Vulnerability and Adaptation – Dr Kanayathu Koshy, USP, Fiji

1800 – 2000 Ice Breaker Reception

DAY 2: Wednesday, 16 June.

0830 – 1000 STATEMENTS OF INTEREST

Ms Eileen Shea moderates the session where participants provide a brief synopsis on the reasons for wanting to attend this Training Institute, their experiences with climate information and application in the Pacific region, and their plans for using newly-acquired skills in their current positions (build on participants' written statements of interest).

1000 – 1015 MORNING TEA

1015 – 1200 COMPLETE STATEMENTS OF INTEREST

1200 – 1300 LUNCH

1300 – 1400 SEASONAL CLIMATE PREDICTION

The seasonal climate predictions – (Dr Simon Mason, IRI, USA)

1400 – 1430 Pacific ENSO Applications Center (PEAC) – (Ms. Eileen Shea)

1430 – 1500 Island Climate Update (NIWA) – Dr Jim Salinger, The Editor, ICU, NIWA

1500 – 1530 Enhanced Application of Climate Predictions in Pacific Island Countries, Mr. Grant Beard (Bureau of Meteorology, Australia)

1530 – 1545 AFTERNOON TEA

1545 – 1615 Seasonal Climate Forecasting in Fiji, Mr. Simon McGree (Fiji Meteorological Service, Fiji)

1615 – 1730 SEASONAL FORECASTING TOOLS AND TECHNIQUES

Introduction to techniques of downscaling Global Regional Climate Model forecasting to the region of interest. Tropical cyclones, droughts and floods etc. (Dr Simon Mason, IRI, USA)

DAY 3: Thursday, 17 June.

Prof. Lal of USP will chair this session

0830 - 1500 EXERCISE 1 SEASONAL FORECASTING METHOD

Participants will investigate statistical methods for seasonal forecasting models through hands-on experience and group exercises. Introduction to steps in data analysis for forecasting. The participants will be expected to prepare a seasonal forecast by the end of the session. – ALL RESOURCE PEOPLE

1500 – 1530 AFTERNOON TEA

1530 – 1730 SEASONAL FORECAST VERIFICATION

Introduction to validation and verification process used in seasonal forecasting. Participants will verify their forecasts from the previous session.(– Dr Simon Mason, IRI, USA)

DAY 4: Friday, 18 June.

0830 – 1000 INTEGRATING TRADITIONAL KNOWLEDGE AND PRACTICES

Panel presentations and facilitated discussion of the opportunities associated with more effectively integrating traditional knowledge and practices in the development and application of climate predictions and enhancing resilience in the face of climate variability and change, Moderators (Mr. Melchior Mataki, Mr. Simon McGree and Dr Kanayathu Koshy)

1000 – 1015 MORNING TEA

1015 – 1230 FROM FORECASTING TO APPLICATIONS: PANEL DISCUSSIONS BETWEEN CLIMATE FORECASTERS AND USERS OF CLIMATE INFORMATION

Panel discussion: Panels of media/users/traditional knowledge consider and propose specific questions. 30 minute group discussion considering future paths and areas of improvement. Importance of considering users/audience; working examples. Users and providers of traditional knowledge: what similarities, differences with Western users, approaches.

1230 – 1330 LUNCH

1330 – 1500 IMPROVING COMMUNICATIONS BETWEEN USERS AND PROVIDERS OF INFORMATION – ROLE OF THE MEDIA

Communicating climate forecasts – challenges and opportunities:

The overview (Fiji TV, Radio Fiji, USP Journalism Head, Kay Gregory (TVNZ), Jan Sinclair, (Auckland University), Delores Clark (NOAA), Jim Salinger, Eileen Shea, Pene Lefale). Discussions with media (radio, TV and print) on challenges of communicating climate information and forecast to users and public.

The media: the crucial interface: brief initial presentations from media panel on situation from their perspective, then open to group discussion, questions, strategising. Dynamism of media, science/media communication differences, positive communication examples.

1500 – 1515 AFTERNOON TEA

1515 – 1730 IMPROVING COMMUNICATIONS BETWEEN USERS AND PROVIDERS OF INFORMATION – ROLE OF THE MEDIA continues

Climate and media panels: improving interaction between climate forecasters and users of climate information: the media role in informing decision makers.

Panel discussion then group discussion. Agreement on important points to emerge from discussions.

DAY 5: Saturday, 19 June.

0830 – 1000 FROM FORECASTING TO APPLICATIONS: PANEL DISCUSSIONS BETWEEN CLIMATE FORECASTERS AND USERS OF CLIMATE INFORMATION continues

MEDIA TRAINING EXERCISES

Presentation by media panellists followed by one-to-one training with participants.

INFORMAL DISCUSSIONS

An opportunity for discussions on course material with lecturers from the first week. There will also be opportunity for participants to focus on improving their statistical seasonal forecasting models.

1000 – 1015 MORNING TEA

1015 – 1200 MEDIA TRAINING EXERCISES AND INFORMAL DISCUSSIONS

DAY 6: Sunday, 20 June. FREE

DAY 7: Monday, 21 June.

0830 – 1000 INFORMAL DISCUSSIONS

An opportunity for discussions on course material with lecturers from the first week. There will also be opportunity for participants to focus on improving their statistical seasonal forecasting models.

1000 – 1010 Introduction to field trip

1010 – 1015 MORNING TEA

1030 – 1600 FIELD TRIP

Navua Town (AIACC Project site-AIACC Research Assistants-Ms. Roshni Lata & Ms. Lusiana Ralogaivau)

DAY 8: Tuesday, 22 June.

0830 – 1000 CLIMATE VULNERABILITY AND ADAPTATION ASSESSMENT IN PACIFIC ISLANDS

Conveners: Dr Kanayathy Koshy, Dr Prof. Lal - USP

Introduction to scenario development, Vulnerability Adaptation Assessment tools (e.g. Cosmic, Maggic/Scengen VandaClim/FijiClim etc...) and programs (V& A Training) at USP.

1000 – 1015 MORNING TEA

1015-1115 Global and regional climate modeling - The current status of available tools, uncertainties and future prospects Dr John Macgregor (CSIRO)

1115 – 1300 CLIMATE CHANGE ADAPTATION–AND ADAPTATION MAINSTREAMING: LESSONS LEARNED FROM VARIABILTY –

(Chair: Dr Kanayathu .Koshy)

Conveners: Ms Eileen Shea, Dr K. Koshy, Dr Mahendra Kumar.

A discussion on recent national, regional and international discussions/negotiations of how adaptation to climate variability provides insights for enhancing resilience in the long-term (eg. UNFCCC, WSSD, BPoA+10).

1300 – 1400 LUNCH

1400 – 1300 OVERVIEW OF CROSS – SECTORAL LINKAGES

Chair: Prof. Leon Zann, USP

Panel presentations and facilitated discussions on case studies (SOPAC, SPREP, agricultural, coastal, health, fisheries and water resources). Note: Panel members may be drawn from Institute participants presenting experiences from their own countries.

1300 – 1315 AFTERNOON TEA

1315 – 1730 SECTORAL CASE STUDIES AND CROSS-SECTORAL LINKAGES continues' Chair: Prof Randy Thaman

DAY 9: Wednesday, 23 June.

0830 - NATIONAL CLIMATE COMMUNICATIONS AND ASSESSMENT REPORTS Chair: Dr Mahendra Kumar

Panel presentations and facilitated discussion of key findings and issues emerging from drafting of National Climate Communications and Assessment Reports, National Sustainable Development Strategy and National Capacity Self Assessment. Note: Panel members and discussants may be drawn from Institute participants who have been actively involved in these activities in their own countries.

DAY 10: Thursday, 24 June.

0830 - 1730 EXERCISE 2 THE FORECASTING GAME

Use a designed scenario and role playing exercise to focus on the "communication" aspects of the development, dissemination, use and evaluation of seasonal climate forecasts to support agricultural decision making with participants playing the roles of four key groups of players: national meteorological service forecasters; sectoral decision makers (e.g., water resource managers); the press/media; and technical experts (e.g., extension agents, NGOs, government or university scientists)

DAY 11: Friday, 25 June.

0830 – 1000 LESSONS LEARNED FROM THE FORECASTING GAME
1000 – 1015 MORNING TEA

1015 – 1300 MANAGING CLIMATE RISKS IN THE PACIFIC REGION

Panel presentations and facilitated discussion of Risk Management:
What is climate risk management
Pacific experience in climate risk management (participants)
Vulnerability and Hazards Assessment in the Pacific (CHARM, Atu Kaloumaira)
Monitoring sea level in the Pacific (Dr Chalupan Kaluwin)
Extreme events - tropical cyclones, floods, droughts
Climate Risk Management and Sustainable Development (SPREP)
Enhancing resilience

1300 – 1400 LUNCH

1400 – 1500 NATURAL HAZARDS MITIGATION IN PACIFIC ISLANDS WITH SPECIFIC FOCUS ON TROPICAL CYCLONES, FLOODS AND DROUGHTS

A Case Study – risk of natural hazards on vulnerable small Pacific Islands. Group discussions on risk management and response strategies during and after a natural hazard. (SOPAC/ RED CROSS/ DISMAC)

1500 – 1515 AFTERNOON TEA

1515 – 1730 CASE STUDY continues

DAY 12: Saturday, 26 June.

0830 – 1000 CASE STUDY GROUP PRESENTATIONS

Lessons learned and recommended response strategies to climate-related natural hazards

1000 – 1015 MORNING TEA

1015 – 1100 LINKING CLIMATE SCIENCE TO SOCIETY: A LOOK AHEAD

1100 – 1200 TRAINING INSTITUTE INSIGHTS AND RECOMMENDATIONS

Participants' give resource lecturers on feedback and how the Training Institute can progress in future.

Institute Directors review lessons learned and next steps.

1200 – 1300 CLOSING CEREMONY AND PRESENTATION OF CERTIFICATES (Prof. Rajesh Chandra, Acting Vice Chancellor, USP)

1300 LUNCH

Appendix 3. A summary of issues raised and evaluation comments by participants during the Fiji Training, 2004.

Recognize connections among local, national, regional and global BUT Focus on understanding local (& sectoral) consequences and developing local (and sectoral) responses:

- One size does not fit all
- Valuable insights and experience from past
- Recognizes context and values
- Sustain dialogue for shared learning & joint problem-solving

Select/use appropriate tools:

- Place- & problem-specific
- Historical data, current observations & monitoring, forecast models, interpretation
- Presentation language, format, timing & content
- Forecasting: statistical techniques + dynamical techniques; ensembles + multi-model runs; regional downscaling
- Vulnerability Assessment: conceptual frameworks + multi-disciplinary studies + quantitative/integrated models + dialogue and decision support
- Traditional & local knowledge + "western science"
- Institutional partnership

Communications Challenges:

- Language – translation, interpretation, dealing with complexities
- Communications infrastructure
- Establishing relationships with key information brokers
- Core users/mission agencies (e.g., Emergency Mgmt)
- Media, press
- NGO's, industry organizations
- Establishing trust & credibility
- Need for close coordination/collaboration with users
- Becoming good listeners (users and providers)
- Understand context, information uses and "routine" information products
- Tailoring products to user needs – shared understanding of information needs and forecast capabilities and limitations
- Format, timing, content, language
- Education and outreach essential
  - Formal education; links with Education Department
  - Informal education

Media Challenges & Opportunities

- Media has critical role in risk management as well as general communication of information
- Build sustained, personal relationships; trust essential; interaction continuous
- Media as an active partner (vs. passive listeners) – "mediators"
- Process of exchanging ideas and developing shared understanding
- Language that helps the listener related to their own experiences;

metaphors/analogies useful (like in forecasting!)

Some media hints:

- Press release: one-page summary with key points at top; additional details behind; be available for interviews
- Remember to explain why the subject is important (to the viewers, readers, public)
- Capitalize on events ("hooks") and look for routine opportunities to engage media
- On television, be aware of: (1) body language; (2) facial expressions; and (3) your words; try not to wear white
- Looking for key messages, memorable quotes & spontaneity

Role of Traditional Knowledge:

- Organize a workshop in/for the Pacific!
- Historical context of changes in climate and local consequences (natural resources & human communities);
- Asset in meeting communications challenges
- Opportunity for a climate/disaster management early warning system — let's pursue this!!!!!!
- Valuable insights into adaptation options – historic and current
- Importance of documentation – preserving the knowledge – by, in and for the Pacific
- Note challenges with documentation, including need to recognize cultural considerations
- Possible role of engaging children
- Loss of language skills
- Recommend (require?) local responsibility and local partners in studies and assessments from the beginning! – avoid the parachuting experts
- Be proactive in securing resources and pursuing projects
- BUILDING TRUST essential; takes time & building personal relationships
- Need to fully acknowledge the local source of knowledge; protecting their intellectual property rights
- Partnership, partnership, partnership
- Need to reinforce respect for the wisdom of elders
- Integrating traditional knowledge in education system
- Examples of plants as indicators of changes in weather and climate – note similarities with the Samoa experience documented in Pene's paper: banana and tropical cyclones; mango flowering and certain conditions; connections between certain plant flowering and certain fish; change in timing & magnitude of saltwater intrusion in Tuvalu; interest in Samoa in AD 1300 Little Ice Age as a possible factor in some Pacific historical events and culture); large ocean swell means tropical cyclone in Queensland; cat scratching face as a sign of rain; cockroach as signs of (prolonged) wet weather; behavior of dogs, frogs & cows as indicators; seeing dolphins means bad weather;
- More biological indicators of weather & climate: Ants marching in several countries; movement of bats; watching leaves – still then storm coming; lizard making noise at night means rain in Tokelau; screaming cats means tropical

cyclone or other event; chickens seeking shelter before rain in Samoa; frigate bird flying west to east means hurricane winds are nearby; sunset colors with rain &/or tropical cyclones;

NEED RESEARCH FUNDING TO SUPPORT DOCUMENTATION AND ANALYSIS OF TRADITIONAL KNOWLEDGE FOR ADAPTATION:

- Several country examples, e.g.: following the moon for crabs, fish, taro planting; certain months & times of month for certain fish – different techniques at different times & weather conditions; relationships with tides for crabs;
- Timing of switch in crops and/or use of marine resources to coincide with start of rainy season – or other weather-related changes;
- Declaration of tapu areas (e.g. small lakes in Cook Islands for breeding milkfish);
- Fermenting breadfruit in Samoa when frigate birds fly west to east;
- Interpreting clouds as signal for fishing;
- People in PNG and Tuvalu who can "stop the wind or rain"

Forecasting to Applications (What do we learn from the Fiji Sugar Case Study):

- A "first time" for collaboration among weather service, sugar industry and university-shared interest;
- Climate central esp. in a rainfed system and extremes play a special role – note lag b/w start of ENSO and drought means there is time for the subsequent dry season;
- Project involved: data collection, correlation analysis (SOI and SST), exploration of the uses of this information (e.g., timing of the rains are important for sugar – if we know the conditions in April/May, can plant early harvest plants or postpone planting; knowledge of rainfall in Jan./Feb./March can help make decisions about shipping and marketing; timing mill operations);
- Currently considering possible changes in FMS products based on results of the study;
- Knowledge alone isn't enough – not always clear what can be done so need to explore options jointly
- Understanding the decision-making context essential;
- Need to improve the dissemination of climate information and training in its use; possible engagement of information brokers like extension agents;

Climate GCM's provide best information into global conditions and changes in the physical climate system but need capability to understand local conditions and, more importantly, socio-economic consequences

- Give reasonable sense of patterns of rainfall, temp., etc.
- Nested regional models
- Statistical techniques for downscaling
- Impacts and V&A models (e.g., PAClim)

GCM's (& other models) can give us "plausible scenarios" (possible futures)

Impact and V&A models can help identify vulnerabilities and explore adaptation (risk management) options

Recognize climate is in a multi-stress context and responses will be multi-dimensional

Address today's problems while planning for the future

Adaptation Mainstreaming:

- Need for continuous process of vulnerability assessment
- Need to demonstrate and document adaptation methodologies
- Pursue regional approach for issues that cross national boundaries
- Need for additional research
- Need for vulnerability indicators
- Look for new guidelines for the next UNFCCC National Communications
- Need to increase participation of Pacific Island experts in UNFCCC and IPCC processes; need sustained advocacy
- Need to increase inter-ministry coordination of climate assessment activities within countries

Adaptation as an ongoing process

- Integrated and holistic (assessment & actions)
- Evolutionary – learning & action
- Continuous assessment/evaluation (science & policy)
- Proactive, flexible, dynamic
- Place & context-specific
- Dialogue, assessment tools, science, observations

Impacts & Cross-Sectoral Linkages-Marine

- Central importance of marine resources; climate-sensitive
- salinity declines/rainfall; temperature extremes; high sedimentation
- Extreme events are essential to reef formation
- Coral reef bleaching as an early impact of climate change – biological indicators of change ("canary in the sea")
- 1997-1998 El Niño – impacts worldwide; continue to today in some areas of the world
- Fiji bleaching event beginning in 2000; ocean temps exceeded the summer maximum for five months—record period
- Bleaching threshold temperature is place-specific; one degree temp. increase can be sufficient – coral more sensitive than previously known
- Corals have been around a long time so they will likely survive globally but with significant changes and possible local extinctions of some species
- Note that there are multiple stresses on coral—can help reduce non-climate stresses
- Effect of ENSO (and climate change) on tuna (and other commercially-important fisheries)
- Changes in ocean productivity
- Declines in growth rate
- Changes in migratory patterns

- Saw an impact on Fiji tuna fishery in this past year
- Abandoned ships create hazardous waste and navigation hazards
- Are seeing longer-term patterns of change; possible reflection of IPO changes?
- Limited capital reserves to "weather" bad years
- Central role of marine resources for local, coastal communities; concerns for the future
- Importance of sharing research insights broadly – with communities, governments and industry
- Importance of integrated land-ocean management for coral & fisheries; e.g., sedimentation impacts from agriculture
- Note implications for food security as well as economy
- Examples of importance of traditional knowledge
- Need for more research on local consequences

Impacts & Cross-Sectoral Linkages --Biodiversity:

- Protecting our biodiversity inheritance as central to ensuring/enhancing resilience and the foundation for our economies
- Maintaining diversification across the board builds resilience (in economy, in knowledge, in biological resources)
- Taking a "Pacific Perspective" forces us to think in an integrated, cross-sectoral way
- Reinforce role of traditional knowledge – and value of integrating traditional knowledge and science
- Example of reforestation in Tonga demonstrating that protecting natural systems more efficient/less costly than restoration
- Example of successful research that addressed multiple aspects of environmental degradation and, through that success, led to action
- Involved all stakeholders
- Address important connections between climate, biodiversity and development planning
- Need for enhanced public awareness and education – shared responsibility
- Role of coastal marine and land resources as protection from extreme events
- Importance of cloud forests as part of islands' hydrology/water resources
- Introduction of alien species as a significant (new) stress with climate implications
- Ethno biodiversity – language, beliefs, knowledge, uses and management systems
- Importance of multi-disciplinary research
- Importance of engaging stakeholders

Impacts & Cross-Sectoral Linkages – Extreme Events

- Importance of being proactive – precautionary principle
- Importance of integrating met departments with mission agencies and importance of coordination/integration among government agencies
- Examples of studies on impacts of climate on island rivers and water resources
- Role of research as a critical role for universities
- Potential value of building links with Japan
- Water resources as a critical issue – clear climate implications
- Links between climate, drought, and infectious diseases like dengue and leptospirosis
- Community-based disaster management (reference to ADPC course emphasizing

grass-roots programs

Adaptation as survival – encouraging that there may be options that will sustain us

Climate extremes as an important focus for research, risk assessment and adaptation

Importance of engaging all regional organizations and institutions in this endeavor

Findings from PICCAP Terminal Project Report:

- Success related to: (1) robust project design with regional coordination but national-level implementation; (2) focus on building in-country expertise – national PICCAP teams; (3) engaging local & regional experts
- Need for enhanced access to information (on climate and socio-economic consequences)
- Highlighted need for cross-sectoral coordination – important in designing project(s)
- Delays arose due to need for technical assistance; financial reporting, funding disbursement and administrative delays

Adaptation as an integral part of a National Risk Management Study

- Add climate to existing risk management portfolios in key sectors
- Climate is an impediment to national economic development
- Emphasize PRACTICAL, "no regrets" approaches
- Integrate traditional knowledge and practices
- Communication, education and outreach
- Enhance capabilities to QUANTIFY and characterize risk
- Climate as part of a weather-climate spectrum
- All of these points reinforced in 2003 New Orleans Adaptation Mainstreaming meeting (see Shea presentation)

Participants' definitions of mainstreaming:

- Prioritization of different aspects of adaptation in the context of national development plans
- Eliminate duplications and conflicts
- Define the key problem and find solutions that benefit not just one sector but everyone as a whole – collaborative effort with all key players
- Getting to the grass roots – understanding your users and what they want and when they want it
- Finding the main problem that cuts across all sectors and addressing that problem
- Strengthen institutions and government
- Practical approach, e.g., in Tuvalu start with a project impact assessment and manage those impacts or finding another alternative
- Simplifying the issue so it can be passed on to the community
- Putting together information on climate variability & change to enhance resilience of Pacific Island communities
- Effectively integrating climate information into socio-economic decision making
- Understanding how the people can/will implement strategies to address issues based on priorities – both government agencies and communities; prioritizing

- See how climate, people and adaptability relate to one another, prioritizing a key
- An "acceptance" of risks and provision of tools to continue the quantification of risk
- Integrated management approach – characterize the present and look to the future
- Addressing issues at regional, national and local levels – setting objectives and implementing them at all levels
- Understanding the issues and finding a path forward, includes understanding
- Practically-resolving local stresses with local resources
- Being specific about the regional, national and local levels – remember to engage governments, NGO's and communities
- Identifying main aspects of a problem, prioritizing them in importance for being resolved and them setting them in an implementation context
- Effectively communicating and understanding considerations of climate into all phases/levels of society
- Engagement of political leaders is essential
- Incorporation of an issue (e.g., rugby or climate change) into the development processes of government – to make it "everyone's business" at all levels; providing and using climate information in everyday business
- Policy level and operational level

New UNFCCC Guidelines for National Communications:

- International commitment under the UNFCCC
- Important tool – inventory of greenhouse gases, building in-country capacity, discussion of vulnerability and identification of mitigation and adaptation options
- Problems with original IPCC methodologies – failed to accommodate local perceptions, values, priorities and insights in the Pacific
- "Scientific data" critical
- Experiences from three participants who had been involved in their country's national communications reports: cross-sectoral teams; focused on greenhouse gas inventory initially; environment ministry had the lead in two; involvement of stakeholders, NGOs as well as government staff; have had some problems with UNDP financial support constraints (i.e., can't pay for civil servants)
- Review of background and UNFCCC context
- Note the UNFCCC emphasis on mitigation therefore emphasis on greenhouse gas inventories
- Some flexibility to provide "any other information that the Party considers relevant…"
- Pacific Island countries among the first to submit their national communications
- New guidelines enhance attention to vulnerability and adaptation assessment (adopted at COP 8)
- Preparing national communications is not mandatory but an opportunity for developing countries to tell their story, undertake national discussions and develop adaptation & mitigation options
- Variety of sources for support of National Communications development
- Country has discretion to determine who's in charge; most choose a "Climate Team"

- Look to IPCC and UNFCCC website regarding opportunities for sugar agriculture

as a greenhouse sink – e.g., Annex II of the Kyoto Protocol
- Re mitigation, most countries are looking at "no regrets" policies (like energy conservation, alternative energy souces, reforestation, etc.)

Broad, multi-lateral environmental agreement context:
- Number of environmental agreements negotiated Internationally and regionally in the Pacific (MEAs)
- Impose a number of obligations on Pacific Islands
- Variety of regional organizations and scientific and education institutions involved
- MEAs can be grouped in terms of themes; there are inter-linkages among them so
- Want to promote integrated approaches, avoid overlap
- Boost national capacity
- Develop shared solutions to shared problems
- Sustainable development as an overarching context
- Recommend undertaking a National Capacity Self Assessment (for effective implementation of MEAs within the context of national sustainable development priorities)
- Resources ($220,000) available to support a NCSA
- Undertaking an NCSA can help identify cross-sectoral linkages and promote coordination and integration

National Sustainable Development Strategy:
- Agenda 21 as the roots
- Meeting needs of present generations without compromising the ability of future generations to meet their own needs
- Economic growth + social development + environmental protection
- Multi-sectoral, multi-temporal and multi-scale

Capacity building -- negotiation, ratification, implementation in the context of Multi-lateral Environmental Agreements (MEAs):

- Important role for all research institutions in the region, including smaller institutions like Fiji sugar research institute in addition to the larger institutions
- Look for partnerships to submit proposals; variety of donors but each has their interests and requirements
- Each country determines how to do an National Country Self Assessment

Appendix 4. Samoa training List of Participants & Resource Persons - 2005

Name	Contact Information	Affiliation

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Resource Personnel

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Dr. Jim Salinger	NIWA	Senior Climate Scientist National Institute of Water & Atmospheric Research Ltd. (NIWA) 269 Khyber Pass Road Newmarket, Auckland NEW ZEALAND **Email:** j.salinger@niwa.co.nz
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APPENDIX 5. Workshop Programme - 2005

Samoa Training Institute on Climate and Extreme Events
May 10 – 20, 2005
Secretariat for the Pacific Regional Environment Programme (SPREP)
Apia, Samoa

Tuesday, May 10

0730	REGISTRATION AND CONTINENTAL BREAKFAST
0830 - 0930	OPENING CEREMONIES
	Opening Prayer – Pastor Elekosi Viliamu, Aleisa West EFKS

Keynote Address – Vaomalo Ulu Kini, Acting Prime Minister and Minister of Policy, Prisons and Fire Services

Opening Remarks:

John Adank, New Zealand High Commissioner

Welcome by SPREP Director (presented by Andrea Volentras on behalf of SPREP Director)

Opening Remarks from Training Institute Co-Directors
Jim Salinger, NIWA
Eileen Shea, East-West Center

Tuesday, May 10

0930 SELF-INTRODUCTIONS

Institute Director moderates a session during which each participant provides a brief introduction to himself/herself and their expectations for the Training Institute (approximately 3-5 minutes each)
0945 Overview of the Training Institute (Eileen Shea)

1015 MORNING TEA

1045 The Pacific Climate System (Jim Salinger)
Introduction to the underlying processes and key features driving climate variability and change in the Pacific

1145 Scientific Aspects of ENSO-Related Interannual Variability in the South Pacific (Murari Lal)
Expanded discussion of Pacific regional aspects of year-to-year variability in climate associated with the El Niño-Southern Oscillation (ENSO)

LUNCH

1400 Consequences of Climate Variability and Change for Samoa (Moderated by Shaun Williams and Dean Solofa)
Panel discussion of the impacts of climate variability and change for Samoa and the information needs of communities, resource managers, businesses and government agencies (assume four panelists with 12-minute presentations followed by group discussion)

1530 AFTERNOON TEA

1600 Seasonal Climate Prediction in the Pacific (Moderated by Mark Morrissey)

Island Climate Update (Jim Salinger)
Australia Bureau of Meteorology and Fiji Sugar Applications project (Mike Coughlan)
Pacific ENSO Applications Center (Eileen Shea)
Commentary: Samoa Perspective on Regional Forecast Products (Dean Solofa)

1800 ICE BREAKER RECEPTION –Hosted by SPREP

Wednesday, May 11

0900 High-Resolution Climate Simulation for Pacific Island Countries: Needs and Prospects (Murari Lal)

0945 Overview of Samoa's Climate (Dean Solofa)

Introduction to the local climatology of Samoa and the main features of seasonal-to-interannual variability as experienced in Samoa

1030 MORNING TEA

1100 Seasonal Climate Prediction, Tools and Techniques (Mark Morrissey)

Introduction to the scientific foundations for predicting seasonal-to-interannual variability in climate and the basic features of global and regional forecasting models

1230 LUNCH

1330 Taking Stock: Group Discussion

Additional questions on and discussion of presentations on seasonal-to-interannual climate prediction

1400 Seasonal Climate Prediction in Samoa: Current Activities and Future Plans (Dean Solofa)

1500 Introduction to Seasonal Forecasting Tools and Techniques (Dean Solofa and Mark Morrissey)

Participants will be introduced to specific tools and techniques that will be used for seasonal climate forecasting in Samoa

1530 AFTERNOON TEA

1600 Introduction to Seasonal Forecasting Tools and Techniques continues

Participants investigate statistical forecasting tools and techniques that provide the basis for seasonal climate forecasting in Samoa through hands-on exercises

1800 ADJOURN FOR THE DAY

Thursday, May 12

0900 Seasonal Forecast Verification (Mark Morrissey)

1015 MORNING TEA

1040 Seasonal Forecast Verification, cont'd

Facilitated group brainstorming on potential applications of seasonal forecasts in key

sectors

Seasonal Forecasting Tools and Techniques

Additional time for hands-on experience with forecasting tools and techniques continues through

1230 LUNCH

1330 From Forecasting to Applications: User Partnerships and the Practical Uses of Climate Information (Moderator: Eileen Shea)

Regional Lessons Learned from recent experience in the Pacific (presentations and panel discussion):
Tonga Agriculture (Jim Salinger)
ENSO Predictability and Crop Data (Dean Solofa)
Pacific ENSO Applications Center (Eileen Shea)
Discussion and group discussion of possible ENSO forecast applications in Samoa

1500 AFTERNOON TEA

1530 Integrating Traditional Knowledge and Practices (Moderator: Dean Solofa)

NIWA traditional knowledge of climate project, including traditional knowledge of weather in Samoa (Jim Salinger)
Group Discussion of individual experience and insights on traditional ways of knowing and responding to changes in weather and climate in Samoa

1700 ADJOURN FOR THE DAY

Friday, May 13

0900 Improving Communications between Users and Providers of Climate Information: The Role of the Media (Moderator: SPREP Representative)

Panel presentations and group discussion of the challenges and opportunities associated with communicating and understanding climate information with a particular focus on the role of print and television media

Jan Sinclair, NIWA
Kay Gregory, TVNZ

1000 Introduction to Media Training Exercises: Effective Press Releases (Jan Sinclair)

1030 MORNING TEA

1100 Media Training Exercises: Effective Press Releases and Radio Interviews (Jan Sinclair)

1230 LUNCH

1330 Media Training Exercises: Effective Press Releases and Radio Interviews Continues (Jan Sinclair)

1530 AFTERNOON TEA

1600 Media Training Exercises: Effective Television Interviews (Kay Gregory)
Individual, real-time experience in on-camera interviews

1700 ADJOURN FOR THE DAY

Saturday, May 14

0900 Media Training Exercises: Effective Television Interviews—Individual on-camera interviews -- Continues (Kay Gregory)

Opportunity for informal discussions with Training Institute lecturers from week one and for additional hands-on experience with seasonal forecasting tools

1000 MORNING TEA

1030 Preview of Coming Attractions: THE RAINS OF TOMORROW (Eileen Shea)
Introduction to the dramatic, role-playing exercise focused on the development and use of seasonal climate forecasts on Navigators Island. Emphasis on communications challenges and exploring opportunities to establish effective partnerships among scientists, forecasters, policy officials, businesses, community leaders and the media
Review of script and detailed shooting schedule
Introduction to key players

1100 THE RAINS OF TOMORROW

The drama begins!

1200 LUNCH

1300 THE RAINS OF TOMORROW CONTINUES

1500 AFTERNOON TEA AVAILABLE

1700 ADJOURN FOR THE DAY

Monday, May 16

0900 Shooting resumes on THE RAINS OF TOMORROW

1030 MORNING TEA AVAILABLE

1215 LUNCH AVAILABLE

1415 THE RAINS OF TOMORROW concludes

Prime Minister's Briefing – The Final Scene
Group discussion of lessons learned

1600 ADJOURN FOR THE DAY

1830-2030 THE RAINS OF TOMORROW Wrap Party (The Lighthouse)
Wear Your Caps!

Tuesday, May 17

0915 Mainstreaming Climate Information for Adaptation (Moderator: Taito Nakalevu)

Introduction to the concept of mainstreaming (Taito Nakalevu)
Some specific examples and/or lessons learned in the Pacific region (Eileen Shea)
Working group discussions of mainstreaming issues in key sectors: Water/Electricity; Agriculture; Fisheries

1030 MORNING TEA

1100 Mainstreaming Climate Information Continues (Moderator: Taito Nakalevu)

Working Group Discussions: Developing Adaptation Roadmaps in Key Sectors

1230 LUNCH

1345 Mainstreaming Climate Information Continues

Education and Outreach Discussion
(Susan Postawko and Dean Solofa)

1445 State of the Art Approaches to Global and Regional Climate Modeling (Kim Nguyen, CSIRO)
1545 AFTERNOON TEA
ADJOURN FOR THE DAY
Wednesday, May 18
0900 Greetings and Introduction to APN-CAPaBLE
(Linda Stevenson, APN)

0920 Climate Vulnerability Assessment and Adaptation
(Moderator: Melchior Mataki)

Introduction to scenario development, vulnerability and adaptation assessment tools and the potential application of those tools in Samoa

Tools for Climate Change Scenario Development – MAGICC/SCENGEN (Melchior Mataki)
Overview of V&A tools and techniques (Taito Nakalevu)
Brief Introduction to the field trip venue – Saoluafata Village -- site of village-level vulnerability and adaptation project (Dean Solofa)

1030 MORNING TEA

1100 FIELD TRIP TO EXPLORE CLIMATE VULNERABILITY AND ADAPTATION OPTIONS AT A SAOLUAFATA VILLAGE—SITE OF CIDA-CBDAMPIC COMMUNITY-BASED ADAPTATION PROJECT

Thursday, May 19

0900 Samoa Climate Change Country Team: Activities, Plans and Needs (Moderator: Dean Solofa)
Representative(s) of Samoa national climate change team representing key sectors discuss ongoing activities and future plans with an eye toward cross-sectoral linkages

1000 MORNING TEA

1030 Samoa Climate Change Country Team – Sectoral Activities
Working group discussions of activities, plans and needs in key sectors

1230 LUNCH

1345 International Climate Change Activities

Brief Overview of the United Nations Framework Convention for Climate Change (Linda Stevenson)
Brief Update on the work of the Intergovernmental Panel on Climate Change: Perspectives from individuals participating in the Fourth Assessment Report (Dean Solofa)

1500 AFTERNOON TEA

1530 Climate Risk Management in the Pacific

CHARM (Eileen Shea for Atu Kaloumaira, SOPAC)
Water Dialogue (Eileen Shea for Marc Overmaars, SOPAC)
Ecosystems and Natural Resources (SPREP Representative)

1700 ADJOURN FOR THE DAY

Friday, May 20

0900 Keeping Our Eye on Climate Variability and Change (Moderator: Mark Morrissey)
An overview of global, regional and local climate observation and monitoring programs
Pacific Islands Global Climate Observing System (Mark Morrissey
Enhancing Local Climate Observations (Mark Morrissey)

1000 MORNING TEA

1030 Keeping Our Eye on Climate Variability and Change Continues (Moderator: Mark Morrissey)

Pacific Islands Global Ocean Observing System (Mark Morrissey or Eileen Shea for Sarah Grimes, SOPAC)
SPaRCE (Susan Postawko)
APN Links to the Global Earth Observing System of Systems—GEOSS (Linda Stevenson)

1200 LUNCH

1300 Writing Effective Proposals for APN (Linda Stevenson)

Overview of APN proposal writing and review process and group discussion of potential opportunities for Samoa's national climate change country team

Friday, May 20

1430 Linking Climate to Society: Review of Training Institute Insights and Recommendations (Moderator: Eileen Shea)

1500 Next Steps: Maintaining the Training Institute Partnerships

Asterio Takesy, SPREP Director
Linda Stevenson, APN
Dean Solofa,Samoa Meteorology
Eileen Shea, Training Institute Directors
Participants

1530 AFTERNOON TEA

1600 Certificate Presentations and Closing Ceremonies

1700 Training Institute Concludes

Closing Social Gathering – SPREP Fale

APPENDIX 6. The Rains of Tomorrow - Samoa

A Dramatization by the
Samoa Training Institute on Climate and Extreme Events
May 14 & 16, 2005

Participants in the May 2005 Samoa Training Institute on Climate and Extreme Events will take part in a role-playing exercise designed to explore the challenges and opportunities associated with developing, issuing and applying seasonal climate forecasts in a fictitious (but realistic) Pacific Islands jurisdiction – Navigator Islands. There are three principal aims to the exercise:

- Refreshing participants understanding of seasonal climate forecasting tools and techniques;
- Exploring potential applications of climate forecasting in key sectors (water resource management, agriculture, forestry and disaster management); and
- Exploring the communications challenges and opportunities associated with the issuance and use of seasonal climate forecasts.

As described in the script and shooting outline below, the drama begins with a presentation of the background climatology of Navigator Islands after which the Training Institute participants will engage in an improvisational exercise in which they will take on the roles of key players including:

- the Navigator Islands Meteorological Service (NIMS);
- the Navigator Islands Ministry for Agriculture, Forestry, Fisheries and Natural Resources;
- the Navigator Islands Ministry for Public Safety and Health which includes the Emergency Management Office, the Power and Water Resource Management Bureau; and
- the local media, specifically, THE COMPASS which is Navigator Islands leading daily newspaper and the Navigator Islands Broadcasting Channel (NBC-1).

NOTE that throughout the drama, each of these groups will have the option of determining the timing and manner of their interactions with the other groups and principal players.

Other principal players in the drama include: The Honourable Shaun Williams, Prime Minister of Navigator Islands; Professor Dean Solofa, a world-famous climate scientist from USP's Navigator Islands campus who has recently been recognized for his groundbreaking work in documenting the climatology of Navigator Islands and determining critical relationships between ENSO and Islands rainfall and tropical cyclone patterns; Susan Postawko, the newly-arrived owner/editor of the COMPASS and her colleague, Kay Gregory, the new Station Manager for NBC-1 (Navigator Islands Broadcasting Channel); and a Spirit-of-Nature responsible for determining the climate conditions for Navigator Islands during the duration of the drama.

The Rains of Tomorrow
Script and Shooting Outline
Saturday, May 14 and Monday, May 16

Saturday, May 14

1030-1100 Directors' Address to the Players

1115-1200 Opening Scene – Our Introduction to the Climate of Navigator Islands

Professor Solofa has recently been honoured by the World Meteorological Organization (WMO) for his groundbreaking work on the climate of Navigator Islands. In recognition of this honour, Prime Minister Shaun Williams has convened a lecture by Professor Solofa to take place on the campus of the University of the South Pacific Navigator Islands campus. Invitees to the lecture and recognition ceremony include representatives of:

- the Navigator Islands Meteorological Service (NIMS);
- the Navigator Islands Ministry for Agriculture, Forestry, Fisheries and Natural Resources;
- the Navigator Islands Ministry for Public Safety and Health which includes the Emergency Management Office and the Power and Water Resource Management Bureau; and
- the local media, specifically, THE COMPASS which is Navigator Islands' leading newspaper and NBC-1, Navigator Islands Broadcasting Company. Both THE COMPASS and NBC-1 are owned by the same company.

The Prime Minister will use the occasion to also announce the initiation of a new seasonal climate prediction and extreme events awareness programme at NIMS. The event is timed to coincide with the release – later that week – of a new three-month seasonal climate outlook by NIMS.

After conferring national honours on Professor Solofa, the Prime Minister will ask him to deliver a lecture providing the following information (copies of Professor Solofa's lecture will be provided):

- The background climatology of Navigator Islands;
- Critical ENSO relationships;
- Current Conditions; and
- A summary of guidance from state-of-the-art global ENSO models.

Following an appropriate period for questions and answers, the lecture will conclude and each of the four groups will return to their offices following the luncheon provided by the Prime Minister.

1200 LUNCH

1300-1500 NIMS staff prepare an initial wet season prediction.

COMPASS and NBC-1 staff meet with new owners to discuss story ideas related to the lecture and the upcoming wet season;

Individual ministry staffs meet to discuss the implications of the upcoming wet season for their areas of responsibility, including discussions of their own interpretations of the material presented by Professor Solofa as well as discussions of policies or actions including consideration of inter-ministry coordination.

1500 **NIMS issues first seasonal forecast for the Navigator Islands**. Players in this group will be responsible for determining both the content of the forecast AND the methods for communication of the forecast to media and key ministries.

1500 **AFTERNOON TEA AVAILABLE**

1500-1630 THE COMPASS staff complete preparation of special evening edition devoted to the NIMS wet season forecast and NBC-1 staff complete preparation of Special Presentation on the wet season forecast.

Ministry staffs consider policy options in response to the forecast.

1630 **THE COMPASS issues special evening edition**
NBC-1 Special Presentation -- optional

1645 **Spirit of Nature provides updated data on current conditions and observations from the first half of the wet season.**

1700 **ADJOURN FOR THE DAY**

Monday, May 16

0900 Director Review's Shooting Schedule for the Day

0915-1030 NIMS develops mid-season forecast update

Ministry staffs consider implications of mid-season update

1030 **NIMS issues mid-season forecast update**

1030 **MORNING TEA AVAILABLE**

1030-1200 COMPASS and NBC-1 staffs consider nature of their mid-season coverage;

Ministry staffs consider mid-season adjustments in policy.

NIMS begins consideration of their performance to date.

1200 **Spirit of Nature provides updated observations covering the full wet season period**

1215 LUNCH AVAILABLE

1230-1400 NIMS evaluates the performance of their new seasonal forecasting programme and consider changes for the future.

Ministry staffs consider their policy decisions in the context of actual events and develop recommendations for the future.

THE COMPASS staff develops and issues a special edition reviewing this year's wet season and NBC-1 staff consider another set of interviews to review the wet season.

NOTE that each group will be required to make a presentation to the Prime Minister on their performance at a personal briefing he has called for 1415 on Monday, May 16.

1415-1530 **Prime Minister's Briefing**

Spokesperson for each of the four role-playing groups present a summary of the actions they took and the insights gained during the dramatization (approximately 10 minutes each with time for questions from the Prime Minister). Suggested questions to guide the presentations follow; suggest highlighting 4-5 key points.

1530-1600 **Director reviews lessons learned and concludes the drama.**

1830-2030 **"Wrap Party" (Lighthouse in downtown Apia)**

Appendix 7. List of Participants and Resource Persons , Kiribati – 2006.

Name	Designation	Organization	Qualification	Contact (email)
Tianeti I Beenna	Senior Agricultural Officer	MELAD, Agriculture Division	Master of Agriculture	Beenna_ti@yahoo.com
Kamatie Kautu	Fisheries Assistant	Min. Fisheries & Marine Resource Development	Cert. Fisheries, FD, PNG, JICA Coastal Fisheries,	tamuerat@mfmrd.gov.ki

			OFCF, Japan	
Tamuera Tebao	Senior Fisheries Assistant	Min. Fisheries & Marine Resource Development	Cert. Fisheries, FD, Tanaea, PNG, JICA Coastal Fisheries, OFCF, Japan	kkautu_3703@yahoo.com
Taratau Kirata	Fisheries Officer	Min. Fisheries & Marine Resource Development	Diploma in Tropical Fisheries, USP	tarataukirata@yahoo.com
Faitele Mika	Economist (Investment)	National Economic Planning Office, Ministry of Finance and Economic Development	Postgraduate Certificate in Climate Change Vulnerability and Adaptation Assessment; BA	mfaitele@hotmail.com or econ6@mfep.gov.ki
Tareti Kireua	Acting Climate Officer	KNMS (Kiribati National Met Service)	WMO Class II	kirimet@tskl.net.ki
Iokenti Beniamina	Senior Meteorological Officer	KNMS	WMO Class III and Cert in Met	kirimet@tskl.net.ki
Teera Tetaam	Meteorological Officer	KNMS	WMO Class IV	kirimet@tskl.net.ki
Bwebwe Tuare	Rural Development Officer	Min. Internal Affair & Social Development	BA – Management, History and Politic	rdo.misa_@yahoo.com
Teata Terubea	Officer-in-Charge; Rural Development Office(RDO)	Min. Internal Affair & Social Development	Postgraduate Diploma in Economic	teata.terubea@yahoo.com
Tianuare Taeuea	Health Inspector	Min. Health and Medical Service	Degree in Environmental Health	mhms@tskl.net.ki
Nenebo.Benetito	Assistant Health Inspector	Min. Health and Medical Service	Certificate in Health Inspection	mhms@tskl.net.ki

Kaobari Matikarai	Senior Statistian	Min. Finance & Economic Planning	MPS- Master in Population Study	kaobari_31@yahoo.com
Tebebeku Teia	Member(KNCC), NGO	KNCC	Retired Civil Servants	ktaburuea@yahoo.com
Aako Betaia	Member(KANGO), NGO	KANGO	Retired Civil Servants	ktaburuea@yahoo.com
Viane Taoba	Member(KCC), NGO	KCC	Retired Civil Servants	ktaburuea@yahoo.com
Batoromaio Kiritian	Curriculum Development Officer(Science)	Min. Education, Youth and Sport	Bachelor of Science	Not available
Batiri Bataua	Communication Officer	Mauri – Newspaper	Reporter	Not available
Raion Bataroma	Publisher	Tarakai - Newspaper	Reporter	Not available
Etita Awira	Communication Officer	Newstar - Newspaper	Reporter	Not available
Rooti Terubea	Chief Editor	Broadcasting & Publication Authority	Reporter	Not available
Titeem Auatabu	Assistant Mineral Officer	Min. Fisheries & Marine Resources Development (Mineral Unit)	Attending related workshops on Mineral	Not available
2 Participants on reserve from Water Unit	Not available	Min. Public Works & Utilities	Not available	Not available
One representative from Lands	Not available	Not available	Not available	Not available
Mike Foon	Ag Environment Inspector	Environment and Conservation Division	Bachelor of Science	Mike.ecd@melad.gov.ki

Puta Tofinga	Assistant EIA Officer	Environment and Conservation Division	Cert in Climate Change trainings	Puta.ecd@melad.gov.ki
Marii Marae	Environment Inspector	Environment and Conservation Division	Bachelor of Art	Marii.ecd@melad.gov.ki
Vika Tofinga	Ag Pollution Control Officer	Environment and Conservation Division	Bachelor of Science	Vika.ecd@melad.gov.ki

Appendix 8. Workshop Programme – 2006

Kiribati Training Institute on Climate and Extreme Events
21st July - 2nd August 2006

Major Thematic Areas
Understanding the Science of Climate Change and Climate Variability

Forecasting Climate

Climate Change Impacts and V&A Tools: the TrainClim Model

Climate V&A Methodologies and Traditional Knowledge

Mainstreaming adaptation

Awareness and Role of Media in disseminating Climate information

Practical training on application and use of Climate Science information e.g., "Rains of Tomorrow"
Opening Ceremony

Day one (FRI 21 JUL 2006)

0800 - 0830	REGISTRATION
0830 - 0930	OPENING CEREMONY

Opening Prayer

Welcome by Director of Environment and Conservation Division: Tererei Abete-Reema

Opening Remarks
Kanayathu Koshy, PACE-SD
Ashmita Gosai, NIWA , NZ

Keynote Address and Opening of the Training Institute: Minister for Environment, Lands and Agriculture Development: Hon Martin Puta Tofinga

Start of Training Sessions

Topic 1: Understanding the Science of Climate Change and Climate Variability

0930 SELF-INTRODUCTION

Institute Director, K. Koshy, moderates a session during which each participant provides a brief introduction of himself/herself and their expectations of the Training Institute (approximately 3-5 minutes each, to be recorded and followed-up during the training)

0945 Overview of the Training Institute (Kanayathu Koshy)

1015 MORNING TEA

1045 The Pacific Climate System (Ashmita Gosai/Janita Pahalad/ Murari Lal)
Introduction to the underlying processes and key features driving climate variability and change in the Pacific

1145 Scientific Aspects of ENSO-Related Interannual Variability in the South Pacific (Murari Lal)
Discussion of Pacific regional aspects of year-to-year variability in climate associated with the El Niño-Southern Oscillation (ENSO)
1245 Enhanced greenhouse effect and global warming (Kanayathu Koshy)

1300 LUNCH

1400 Impacts of Climate Variability and Change: a global /regional perspective (K. Koshy + M. Mataki)

1445 Introduction to the local climatology of Kiribati and the main features of seasonal-to-interannual variability as experienced in Kiribati (Taareti. Kireua, Representative from Kiribati Met Office)

1530 AFTERNOON TEA

1600 Consequences of Climate Variability and Change for Kiribati (Moderator: Tererei Abete-Reema, CCST)

Panel discussion: (Eita Meetai, Naomi Atauea, Maere Tekanene (Chamber of Commerce) and Pastor Teruro (NGO))of the impacts of climate variability and change for Kiribati and the information needs of communities, resource managers, businesses and government agencies (assume four panelists with 12-minute presentations followed by group discussion)

ICE BREAKER RECEPTION

Topic 2: Forecasting Climate

Day two (MON 24 JUL 2006)

0900 High-Resolution Climate Simulation for Pacific Island Countries: Needs and Prospects (Murari Lal)

0945 Seasonal Climate Prediction in the Pacific (Dean Solofa, SPREP)

Island Climate Update (Ashmita Gosai/ Janita pahalad)
Fiji Sugar Applications Project (Janita Pahalad , BOM, Australia)

1100 Seasonal Climate Prediction, Tools and Techniques (Dean Solofa)
Introduction to the scientific foundations for predicting seasonal-to-interannual variability in climate and the basic features of global and regional forecasting models

1200 Seasonal Climate Prediction in Kiribati: Current Activities and Future Plans (Taareti. Kireua, Kiribati Met Office, Janita Pahalad)

1230 LUNCH

1330 Taking Stock: Group Discussion (Moderator: K Koshy)
Additional questions/comments on seasonal-to-interannual climate prediction

1400 Introduction to Seasonal Forecasting Tools and Techniques (Dean Solofa and Murari Lal)

Participants will be introduced to specific tools and techniques that will be used for seasonal climate forecasting in Kiribati

1530 AFTERNOON TEA

1600 Introduction to Seasonal Forecasting Tools and Techniques continues (Hands-on exercises) (Dean Solofa and Murari Lal)

Participants investigate statistical forecasting tools and techniques that provide the basis for seasonal climate forecasting in Kiribati through hands-on exercises

1730 ADJOURN FOR THE DAY

Day three (TUE 25 JUL 2006)

Topic 3 *Climate Change Impacts and V&A tools: TrainClim Model*

0900 Introduction and orientation to the model (Peter Kouwenhoven, IGCI, Uni of Waikato)

1000 MORNING TEA

1030 TRAINING Session 1: Climate change scenarios, local sea level scenarios

Objectives: Get used to the user interface. Explore climate change scenarios.

[Note: TRAINING Sessions 1- 5 will be coordinated by Dr Peter Kouwenhoven]

1230 LUNCH

1330 TRAINING Session 1 Continued

1400 TRAINING Session 2: Water tank model

Objective: Use climate change information for a simple planning problem. Define and evaluate adaptation options.

Impact Models: Water: Rainwater consumption

DEMO with SIMCLIM: Aitutaki case study

1530 AFTERNOON TEA

1600 TRAINING Session 3: Flooding & Climate change

Objective: Analyse river floods and climate change. Repeat some of the aspects learned earlier.

Impact Models: Water: Flow analysis/Flooding: High Flow

1700 ADJOURN FOR THE DAY

Day Four (WED 26 JUL 2006)

Topic 3 Contd... : Vulnerabilities and Adaptation Assessment tools

0900 TRAINING Session 3: Flooding & Climate change (Contd)

1000 TRAINING Session 4: Storm surge flooding & Cost benefit analysis

Objective: Another climate change impact. Cost benefit analysis: time-horizon, discount rate

Impact Models: Coast: Cyclone flooding model

1030 MORNING TEA

1100 TRAINING Session 4: Storm surge flooding & Cost benefit analysis (Contd)

1230 LUNCH

1330 TRAINING Session 5: Free exercise

Objective: Explore other options of TRAINCLIM (i.e. agriculture, freshwater lens or health)

Tasks:

Explore the (other) parts of TRAINCLIM that you are also interested in:

Health (Impact Models: Health)
Evaluate the effects of climate change on a) Malaria epidemic potential, or b) Dengue epidemic potential.

Shoreline change (sand): (Impact Models: Coast: Shoreline change (sand))
Effects of climate change on shoreline dynamics.

Coastal inundation: (Impact Models: Coast: Coastal inundation)
Effects of climate change on coastal flooding from SLR.

Agriculture: (Impact Models: Agriculture)
Evaluate the effects of climate change on the yields of different crops.

Freshwater lens: (Impact models: Water: Freshwater lens)
Effects of climate change on the fresh water lens dynamics.

1530 AFTERNOON TEA

1600 TRAINING Session 5: Free exercise (Contd)

ADJOURN FOR THE DAY

Topic 4: Climate V&A methodologies and Traditional Knowledge

Day Five (THU 27 JUL 2006)

0900 Climate Change V&A Methodologies (Kanayathu Koshy, Murari Lal and M. Mataki)
An overview of V&A Methodologies outlining the key components of climate change vulnerability and adaptation assessment methodologies (Kanayathu Koshy)

Introduction of climate change scenarios and their significance for climate change adaptation (Murari Lal, M. Mataki).

1015 MORNING TEA
1030 Climate Variability and Change Vulnerability Assessment and Adaptation Tools
Introduction to some simple tools for scenario development, vulnerability, and adaptation assessment tools and the potential application of those tools in Kiribati (Melchior Mataki, Murari Lal)

0900 Consolidation of hands on training so far and evaluation.

1000 MORNING TEA

1030 User Partnerships and Practical Uses of Climate Information

Sugar and ENSO Fiji (Additional Comments: Janita Pahalad)
Kiribati experience

1230 LUNCH

1330 Integrating Traditional Knowledge and Practices (Moderator: Nakibae Teuatabo)

Aspects of NIWA traditional knowledge climate project, including traditional knowledge of weather in Kiribati Samoa, (R. Abeta, M. Mataki)
Group Discussion of individual experience and insights on traditional ways of knowing and responding to changes in weather and climate in Kiribati (Community Elders participating)

1500 AFTERNOON TEA

1530 Documentation of Traditional Practices.

1700 ADJOURN FOR THE DAY

Topic 5: Mainstreaming Adaptation

Day Six (FRI 28 JUL 2006)

0915 Introducing Mainstreaming Climate Information (Moderator: Dean Solofa/Melchior Mataki)
Introduction to the concept of mainstreaming (Dean Solofa/Melchior Mataki)
Some specific examples and/or lessons learned in the Pacific region (Mary Larson, Kanayathu Koshy)

1030 MORNING TEA

1100 *Aspects of mainstreaming through Kiribati Adaptation Project - KAP (Kaiarake. Taburuea)*
1200 Brainstorming and Discussion on current and future plans of KAP mainstreaming activities (moderator Nakibae Teuatabo)

1230 LUNCH

1330 International and Regional Cooperation in assisting adaptation - Funding possibilities, Group discussion led by Mary Larson and PACE-SD

1400 Mainstreaming Climate Change: Sectoral Approach (Moderator: Dean Solofa /Melchior Mataki)
Working group discussions of mainstreaming issues in Key sectors i.e. Water, Coast and Fisheries

1530 AFTERNOON TEA

1630 Mainstreaming Climate Exercise continues (Moderator: member of CCST))
Presenting Adaptation Roadmaps in Key Sectors
Working group further Discussion

ADJOURN FOR THE DAY

Topic 6: Awareness and Role of Media on disseminating Climate information
Day Seven (MON 31 JUL 2006)

0900 Improving Communications between Users and Providers of Climate Information: The Role of the Media (Moderator: Bwatiri Bwataua, Representative from Kiribati Media)

Panel presentations and group discussion of the challenges and opportunities associated with communicating and understanding climate information with a particular focus on the role of print and television media

Kiribati Climate team
Mosmi Bhim , USP

1000 Introduction to Media Training Exercises: Effective Press Releases (Mosmi Bhim, USP)

1030 MORNING TEA

1100 Media Training Exercises: Effective Press Releases and Radio Interviews (Kiribati media, Mosmi Bhim)

1230 LUNCH

1330 Media Training Exercises: Effective Press Releases and Radio Interviews Continues (Mosmi Bhim, (Tiroia Tetabea, Kiribati media)

1530 AFTERNOON TEA

1600 Media Training Exercises by M Bhim: Contd

1700 ADJOURN FOR THE DAY

Topic 7 Practical training on application and use of Climate Science Information
Day Eight (TUE 1 AUG 2006)

1030 Preview of Coming Attractions: THE RAINS OF TOMORROW (Dean Solofa, Mosmi Bhim, K. Koshy)

Introduction to the dramatic, role-playing exercise focused on the development and use of seasonal climate forecasts on Navigators Island. Emphasis on communications challenges and exploring opportunities to establish effective partnerships among scientists, forecasters, policy officials, businesses, community leaders and the media
Review of script and detailed shooting schedule
Introduction to key players

1100 THE RAINS OF TOMORROW
The drama begins!
And continues

1200 LUNCH

1300 THE RAINS OF TOMORROW CONTINUES (led by D. Solofa and M. Bhim)

1415 THE RAINS OF TOMORROW concludes

Prime Minister's Briefing – The Final Scene
Group discussion of lessons learned

1600 ADJOURN FOR THE DAY

1830-2030 THE RAINS OF TOMORROW Wrap

CLOSING CEREMONIES

Day Nine (WED 2 AUG 2006)
0930 Consolidation of Training activities (Led by Kiribati Organising team)

1000 Keynote Address – (Hon Natan Teewe, Minister for Communications, Transport, and Tourism Development

1100 Certificate Presentations (Interactive)

1200 Training Institute Concludes

Closing Remarks from Participants

Closing Remarks from Training Institute Co-Directors
Riibeta Abeta, Kiribati Team Leader
Kanayathu Koshy

1300 LUNCH (end of training)

1800 Closing Social Gathering (Evening)

7.3: TrainCLIM Exercises

TRAINING 1: (100 min) Introduction, Climate change scenarios, local sea level scenarios

Objectives: Get used to the user interface. Explore climate change scenarios.

Tasks:

1. Start program. Explore interface: Area selection [Right top], function selection [Left top], functions. Right click on desktop.

Q: Which spatial areas are included in the model?
Q: Where is the "help" located?
Q: What are the different ways to access the menus?

Scenario generator: Global projection

2. Global projection. Learn about the A/B scenarios. Explore outputs (Temperature, SLR,

CO2). Understand relationships between outputs.
Q: Which scenario gives the highest temperature increase? What is the corresponding CO2 concentration?
Q What is the (numerical) difference between SLR (total) and SLR (thermal)?

Scenario generator: Spatial scenario generator

3. Spatial scenarios. Learn about spatial distributions. Analyze the outputs.
Q: For a selected scenario and area, how does the mean temperature change between 1990 and 2100 (both absolute and relative)? Explain the pattern. (*hint: use link images, map calculator, view pattern*).
Q: Do the same for precipitation. Explain the patterns.

Scenario generator: Site-specific scenario generator

4. Site specific sea level scenarios. Understand different components for local SLR.
Q: Experiment with the different settings in the SLR-scenario generator. What is the influence of (local) vertical land-movement? Can SLR be negative?

TRAINING 2: (45 min) Water tank model

Objectives: Use climate change information for a simple planning problem. Define and evaluate adaptation options.

Impact Models: Water: Rainwater consumption

Tasks:

1. Without any climate change, what are reasonable values for the model parameters? (daily usage/person, persons/household, households/water tank, water tank size, effective roof area). Set a critical dry period.
Q: How do the parameters influence the results?
Q: Which adaptation options are possible?
Q: What is their effectiveness? What is your preferred setup?

2. Evaluate your solution under climate change. Find the most extreme scenario. Use the extreme event analysis to analyse the return periods for drought lengths.
Q: Was your previous solution robust?
Q: What is the main problem with applying the climate change scenarios for precipitation for small islands in the pacific?

TRAINING 3: (90 min) River flooding & Climate change

Objectives: Analyse river floods and climate change. Repeat some of the aspects learned earlier.

Impact Models: Water: Flow analysis/Flooding: High Flow

Tasks:

1. Explore the flooding model. Find the extreme event value for a 1:50 year event.
Q: What is the likelihood of having at least 1 such event in the coming 20 years?

2. Compare baseline and scenarios.
Q: What is the flooded area (1:50 year event) under the baseline?
Q: What is flooded additionally under the scenario?
Q: What is the extreme event (1:50) now?
Q: What is the likelihood now of the baseline extreme event?

3. Use the Climate Data Browser to analyze the flow.
Q: Which month has on average the highest flow?

TRAINING 4: (100 min): Storm surge flooding & Cost benefit analysis

Objectives: Another climate change impact. Cost benefit analysis: time-horizon, discount rate

Impact Models: Coast: Cyclone flooding model

Tasks:

1. Analyze the flooded area (Physical event); without and with Climate change (ie. 1:50 year event) (use vector overlay to add features); consider cyclone frequency changes
Q: What is the effect of the recession rate (ie. values 0.5 and 0.75)?

2. Do a cost-benefit analysis (Economic impact), without land use change. Evaluate the adaptation options.
Q: Which adaptation option has the best performance?
Q: Is it worthwhile to combine options?
Q: What is the effect of the discount rate?

3. Now add land use change. Evaluate the various options and there impacts.
Q: The autonomous behaviour regarding the (re)building of infrastructure interacts with the effects of adaptation. Find an example?

TRAINING 5: (45 min): Free exercise

Objectives: Explore other options of TRAINCLIM (ie. agriculture, freshwater lens or health)

Tasks:

Explore the (other) parts of TRAINCLIM that you are also interested in:

Health (Impact Models: Health)
Evaluate the effects of climate change on a) Malaria epidemic potential, or b) Dengue epidemic potential.

Shoreline change (sand): (Impact Models: Coast: Shoreline change (sand))
Effects of climate change on shoreline dynamics.

Coastal inundation: (Impact Models: Coast: Coastal inundation)
Effects of climate change on coastal flooding from SLR.

Agriculture: (Impact Models: Agriculture)
Evaluate the effects of climate change on the yields of different crops.

Freshwater lens: (Impact models: Water: Freshwater lens)
Effects of climate change on the fresh water lens dynamics.

7.4 Training Institute role-playing exercise Adapted by Dean Solofa

Appendix 9. The Rains Tommorrow- Kiribati

A Dramatization by the
Kiribati Training Institute on Climate and Extreme Events
Tuesday 1 August 2006

Participants in the Kiribati Training Institute on Climate and Extreme Events will take part in a role-playing exercise designed to explore the challenges and opportunities associated with developing, issuing and applying seasonal climate forecasts in a fictitious (but realistic) Pacific Islands country – Navigator Islands. There are three principal aims to the exercise:

- Refreshing participants understanding of seasonal climate information,
- Seasonal climate forecasting tools and techniques;
- Exploring potential applications of climate forecasting in key sectors (water resource management, agriculture, mangrove forestry and disaster management); and
- Exploring the communications challenges and opportunities associated with the issuance and use of seasonal climate forecasts.

As described in the script and shooting outline below, the drama begins with a presentation of the background climatology of Navigator Islands after which the Training Institute participants will engage in an improvisational exercise in which they will take on the roles of key players including:

- the Navigator Islands Meteorological Service (NIMS);
- the Navigator Islands Ministry for Fisheries Resources;
- the Navigator Islands Ministry for Coastal Resources which includes the Emergency Management Office, the Power Management Bureau;
- the Navigator Islands Ministry for Water Resources which includes a Water and Health advisory office;

- The Ministry of Finance and the Presidential Office that together that respectively sets policy and implements the Navigator Islands climate change and variability development and adaptation fund; and
- the local media, specifically, THE COMPASS which is Navigator Islands leading daily newspaper and the Navigator Islands Broadcasting Channel (NBC-1).

NOTE that throughout the drama, each of these groups will have the option of determining the timing and manner of their interactions with the other groups and principal players

Other principal players in the drama include:

- The Honorable Riibeta Abeta, President of Navigator Islands;
- Professor Taareti Kireua, a world-famous climate scientist from USP's Navigator Islands campus who has recently been recognized for his groundbreaking work in documenting the climatology of Navigator Islands and determining critical relationships between ENSO and Islands rainfall and drought patterns;
- Mosmi Newstar, the newly-arrived co-owner and co-editor with Bwatiri Bwatana of the NI COMPASS and their colleague, Rooti "The Rock" Terubea, the new Station Manager for NBC-1 (Navigator Islands Broadcasting Channel); and a Spirit-of-Nature Tabuariki responsible for determining the climate conditions for Navigator Islands during the duration of the drama.

The Rains of Tomorrow
Script and Shooting Outline
Tuesday, August 1

0900-0915 Director's Address to the Players

0915-0945 Opening Scene – Our Introduction to the Climate of Navigator Islands

Professor Taareti has recently been honoured by the World Meteorological Organization (WMO) for his groundbreaking work on the climate of Navigator Islands. In recognition of this honour, President Riibeta Abeta has convened a lecture by Professor Taareti to take place on the campus of the University of the South Pacific Navigator Islands campus. This lecture will also coincide with the issue of the Navigator Islands Meteorological Service (NIMS) first ever seasonal climate forecast (developed and assisted by Professor Tareti).

Invitees to the lecture and recognition ceremony include representatives of:

- the Navigator Islands Meteorological Service (NIMS);
- the Navigator Islands Ministry for Fisheries Resources;
- the Navigator Islands Ministry for Coastal Resources which includes the Emergency Management Office, the Power Management Bureau;
- the Navigator Islands Ministry for Water Resources which includes a Water and Health advisory office;

- The Ministry of Finance the Presidential Office that controls a climate change and variability development and adaptation fund; and
- the local media, specifically, THE COMPASS which is Navigator Islands leading daily newspaper and the Navigator Islands Broadcasting Channel (NBC-1).

The President will use the occasion to also announce the initiation of the new seasonal climate prediction and extreme events awareness programme at NIMS. The event is timed to coincide with the release of a new three-month seasonal climate outlook by NIMS.

After conferring national honors on Professor Taareti, the President will ask him to deliver a lecture providing the following information (copies of Professor Taareti's lecture will be provided):

- Brief on Navigator Islands setting
- Navigator Islands' rainfall and mean temperature trends
- Navigator Islands and ENSO variability
- Droughts and impacts
- Climate monitoring in Navigator Islands

Following an appropriate period for questions and answers, the lecture will conclude and each of the four groups will return to their offices following the morning tea provided by the President.

0945 COMPASS and NBC-1 staffs meet to discuss media story ideas related to the lecture and the forecast for the upcoming wet season;

Individual ministry staffs meet to discuss the implications of the upcoming wet season for their areas of responsibility, including discussions of their own interpretations of the material presented by Professor Taareti as well as discussions of policies or actions including consideration of inter-ministry coordination.

1030 **Working Morning Tea Available**

Media and Ministries continue their work.

THE COMPASS staff completes preparation of special edition devoted to the NIMS wet season forecast and NBC-1 staff complete preparation of Special Presentation on the wet season forecast.

Ministry staffs continue to consider policy, technical, grassroots options in response to the forecast.

1215 **Spirit of Nature Tabuariki provides updated data on current conditions and observations from the first half of the wet season.**

1230 **Working Lunch Available**

Ministry staffs consider implications of mid-season update
NBC-1 Live NI Radio Talkback Show:

- radio talk show host DJ Rooti "The Rock" interviews the award winning Professor Taareti and the CEOs of the Ministries and asks how they did based on the seasonal climate forecast that was provided to them by the President's favorite scientist. There is an invited surprise guest.

1300 **NIMS issues mid-season forecast update**

COMPASS and NBC-1 staffs consider nature of their mid-season coverage;

Ministry staffs consider mid-season adjustments in policy.

NIMS begin consideration of their performance to date.

1430 **Spirit of Nature Tabuariki provides updated observations covering the full wet season period**

1500 Working Afternoon Tea available

NIMS evaluates the performance of their new seasonal forecasting programme and consider changes for the future.

Ministry staffs consider their policy decisions in the context of actual events and develop recommendations for the future.

THE COMPASS staff develops and issues a Special Edition Newspaper reviewing this year's wet season and NBC-1 staff consider another set of interviews to review the wet season.

NOTE that each group will be required to make a presentation to the President on their performance at a personal briefing he has called for 1630 on Tuesday, August 1.

1630 **President's Briefing**

Spokesperson for each of the four role-playing groups present a summary of the actions they took and the insights gained during the dramatization (approximately 10 minutes each with time for questions from the President). Suggested questions to guide the presentations follow; suggest highlighting 4-5 key points.

1730 **Director reviews lessons learned and concludes the drama.**