

# THE AUSTRALIA/SPREP COASTAL VULNERABILITY INITIATIVE FOR ATOLL STATES

## Workshop Report

### 1. INTRODUCTION

#### 1.1 Background

In February 1997, Environment Australia and the South Pacific Regional Environment Programme (SPREP) sponsored a workshop for atoll states in the Republic of Kiribati. This workshop comprised Phase 2 of an Australia/SPREP Vulnerability Initiative for Atoll States.

The Australia/SPREP Vulnerability Initiative was proposed at the South Pacific Environment Ministers Meeting in Brisbane in 1995, when the Australian Minister for the Environment offered to support a joint Australia/SPREP project. The project aims to build upon previous work done by SPREP, the preparatory vulnerability assessment missions which have been undertaken in the South Pacific and the work of both the US Country Studies Program and Japan. A key element of the Initiative is that workshop development and subsequent training focus on direct face to face contact with Pacific Island environmental management staff within their home countries wherever possible.

A steering committee comprising officers from Environment Australia and SPREP as well as two non-government members from Australia was established to oversee the project with Professor Roger McLean as Chair. Steering Committee members are Professor Roger McLean, Chalapan Kaluwin (SPREP), James Aston (SPREP), Louise Rose (Environment Australia) and Peter Waterman (Australia).

#### 1.2 Objectives of the Initiative

The overall goals of the Initiative are to:

- (i) assist in building the capability of Pacific Island Countries in the assessment of and response to coastal impacts of climate change and sea level rise; and
- (ii) improve communication between Pacific Island Countries, Australia and SPREP with respect to those impacts and the development of adaptations and response strategies.

#### 1.3 Description of the Initiative

The project is being conducted in three phases.

*Phase 1* consisted of preliminary visits to the atoll nations of Tuvalu, Kiribati, Marshall Islands and Federated States of Micronesia by three members of the steering committee Roger McLean (Australia), Chalapan Kaluwin and James Aston (SPREP). During this phase the critical issues relating to climate change and sea level rise were identified from the perspective of the environmental managers in each of the atoll countries. In-

country expertise was also identified as well as potential contributors to the workshop. Phase 1 was completed in October 1996.

*Phase 2* consisted of the workshop which brought together a range of environmental practitioners and other operational staff from atoll states to discuss issues in their countries both among themselves and with experts from Australia and SPREP.

The governments of atoll countries nominated one or two representatives to participate in and contribute to the workshop. The names of participants and their contact details are listed in Appendix 1. Participants presented technical papers based on themes identified during Phase I including:

- coastal erosion;
- management of water resources;
- resettlement;
- resources and tools required; and
- environmental policy and planning.

The case studies presented at the workshop revealed that the concerns of atoll nations and low-lying islands about their vulnerability to climate change and sea level rise are regarded as both serious and urgent. They are also quite similar, although the manner in which island resources are utilised and the nature of the adaptive and response strategies are surprisingly diverse.

This report summarises the main issues discussed at the workshop and suggests 'future directions' for the Initiative.

*Phase 3* will focus on some of the critical issues identified during phases 1 and 2. It will provide targeted in-country and, if appropriate, regional training opportunities. Where possible, atoll country expertise as identified in the workshop and during phase 1 will be utilised.

## **2. WORKSHOP BACKGROUND**

### **2.1 Workshop Objectives**

The objectives of the workshop were:

1. To assist atoll countries from around the world, particularly Pacific Island atoll countries, in the assessment of, and response to, coastal impacts of climate change and sea - level rise, through the sharing of expertise, experience and ideas.
2. To build confidence and improve the skills and knowledge of environmental practitioners and other operational staff from the governments of atoll countries.

The exchanges of information about the possible impacts, adaptations and responses to climate change at the workshop provided a good opportunity to identify suitable

projects to be undertaken in phase 3 and others that will require significant further funding.

## **2.2 Workshop Description**

The workshop was held in Tarawa, Republic of Kiribati. It was attended by participants from countries made up wholly or predominantly of atolls or low islands - Tuvalu, Republic of the Marshall Islands, Federated States of Micronesia, Cook Islands, Republic of Maldives as well as several participants from Kiribati. A representative from the Torres Strait Regional Development Authority was sponsored to participate by Environment Australia.

In addition to the present report, outputs from the workshop will include

- a volume of proceedings containing papers presented at the workshop to be published by Environment Australia;
- an expanded publication which will include additional related papers to be produced by SPREP as a part of its Reports and Studies Series.

Two other meetings were held in parallel with the workshop. The first was a meeting of Lead Authors of the Small Island States chapter of the Special Report on *Regional Impacts of Climate Change* being prepared for the Intergovernmental Panel on Climate Change (IPCC). This meeting was chaired by Convening Lead Author Dr Leonard Nurse (Barbados). The second was the annual meeting of the Project Coordinating Committee for the South Pacific Sea-Level and Climate Monitoring Project (AusAID) held immediately after the workshop.

## **2.3 General Issues Identified by the Workshop**

It was not one of the objectives of the workshop to come up with formal recommendations. Nevertheless there was considerable agreement regarding the following issues.

1. Presentations made at the workshop confirmed that the *assessment* of vulnerability to climate change and sea level rise is of the utmost importance to atoll nations and low islands in the long term as is the *identification* of appropriate adaptations and response measures. While it was recognised that there is a significant need for assistance in these areas, the workshop made it clear that some of that assistance is available 'within country' or within the atoll nations and island territories, represented at the workshop.
2. There are a number of important, present day environmental problems that should be addressed as a matter of urgency to avoid serious impacts on the health and welfare of some atoll islanders. Solutions to these problems are not easy and include physical, cultural and socio-economic aspects. There was general agreement that solutions need to be developed and incorporated into both present day and future planning and policy.
3. It also became clear that standardised methodologies developed for several aspects of the climate change issue, including vulnerability assessment are not appropriate in most atoll and low island situations. However there was agreement that

there are good prospects for developing relevant methodologies for atoll nations and low islands utilising the expertise present in the region and in regional organisations. Resources will be required to facilitate development of methodology/ies which will inevitably have a different emphasis (and sometimes be simpler) than the internationally developed "common methodology".

4. The atoll nations and territories represented at the workshop comprise many islands and, in the case of some countries, hundreds of islands in several identifiable groups. While a great deal of attention has been paid to the capital island or main urban area - where the problems are most acute - very little attention has been given to the outer islands. While not denying the seriousness of the environmental problems associated with the areas of highest population numbers and density, the workshop felt that it was also important to consider the secondary centres and outer islands before any developing problems in those areas became too serious.

5. There are several environmental issues common to all atoll nations and low islands. There is, however great variation in the existence and effectiveness of planning and coastal management frameworks and in the assessment of and response to climate change and sea level rise within these frameworks. Land ownership, central and island government priorities, education, awareness and development project evaluation were identified as some of the constraints that need to be taken into account in improving environmental management and planning.

6. A shortage of data and of simple analytical techniques were identified as major limitations for both short and long-term planning. Adaptations and response strategies receive very little attention. The use of traditional measures needed further study. Staff within atoll countries have, however, in recent years, developed an understanding of the concepts and tools required to address climate change and sea-level rise. Capability and confidence building should build upon this understanding.

7. In atoll and low island situations integrated coastal management was seen as an appropriate sustainable development concept but should be broadened to whole atoll or low-island integrated management..

### **3. WORKSHOP PROGRAM**

#### **3.1 Summary**

The main venue for the workshop was the Otintaai Hotel in Bikenibeu, South Tarawa. On Wednesday afternoon the workshop moved to the University of the South Pacific Centre and Atoll Research Programme. A field excursion was also held. A program summary is given in Appendix 2.

#### **3.2 Opening ceremony**

The workshop was opened by His Excellency Beretitenti Teburoro Tito, President of the Republic of Kiribati. The opening was attended by Cabinet Ministers, Secretaries and spouses as well as by members of the diplomatic corps including the High Commissioner for Australia, the High Commissioner for New Zealand and the Ambassador for the People's Republic of China. In addition to workshop participants, experts from the IPCC small island states meeting were also in attendance.

##### **3.2.1 Welcome address**

In his opening statement the chair of the steering committee welcomed the distinguished guests and all participants and thanked the Government of the Republic of Kiribati for offering to host the workshop and associated meetings. Professor McLean then outlined the history of the Australia/SPREP Initiative noting that it grew out of a common concern over the vulnerability of the small island nations of the South Pacific and that the South Pacific Forum had identified such nations as a priority area for the development of adaptive response strategies for future sea level rise and climate change. He also noted that the Initiative was an example of the regional cooperation outlined in the 1995 *Commonwealth Coastal Policy* which states that the Australian Government wishes to support projects related to vulnerability assessment throughout the South Pacific, and to assist countries to develop response measures appropriate to small islands.

Professor McLean went on to describe the phases of the Australia/SPREP Initiative. He also commented that the Initiative is unique for three reasons. First, it focussed specifically on atoll nations or states where atolls or low islands made up a significant proportion of the country. Second, it was the first time such a workshop had been held on an atoll. And third, all of the workshop presentations would be given by participants from the small island states and territories.

Finally he noted that a challenge for the workshop - as well as for the IPCC lead authors meeting - was to develop realistic approaches that would provide complementary solutions to both present day problems such as coastal erosion and water resources and longer - term issues such as climate change and sea level rise.

##### **3.2.2 Statement from SPREP**

Dr Chalapan Kaluwin, Climate Change Officer (SPREP) thanked the Government for organising the workshop, noting that Kiribati had always been a substantial contributor to regional initiatives on environmental issues, as well as being a significant player in international negotiations relating to climate change. He noted that the present workshop was

one of several projects that dealt with climate change and sea level rise in the region. Other projects included

- (i) the US Country Studies Program in which the Marshall Islands, Federated States of Micronesia and Kiribati were participating;
- (ii) the Japanese funded vulnerability studies in which Tuvalu, Fiji and Western Samoa were participating;
- (iii) the Forum/AusAID Sea level and Climate Monitoring Project, which had established a tide-gauge network throughout the region;
- (iv) the US funded Central Pacific Radiation Experiment; and
- (v) the Pacific Island Climate Change Assistance Project (PICCAP) being supported by the Global Environment Facility.

Dr Kaluwin also drew attention to the obligations of countries under the UN Framework Convention on Climate Change and stressed the important role that Kiribati and other small island states in the region had played and could continue to play in the future. He believed that the workshop and associated meeting would strengthen the linkages among small island states with similar atoll or low island environments and also strengthen their resolve to reduce vulnerability and enhance resilience to the threat of climate change and sea level rise.

### 3.2.3. Opening Address

In his opening address H.E. Beretitenti Teburoro Tito extended a very warm welcome from the people and Government of Kiribati and on their behalf and that of all the states represented at the workshop and meeting he thanked SPREP, the Government of Australia and the IPCC for their assistance and sponsorship.

President Tito commented that it seemed fitting that Kiribati, being one of the possible victims of global warming and sea-level rising was chosen to be the venue for this first workshop and meeting of experts. He also found it "...significant that this gathering is coinciding with one of the highest tides in Kiribati as that will enable you to witness what a sea-level rise of one or two centimetres means to Kiribati."

President Tito then went on to express his belief that

a gathering such as this should come out with some resolution or understanding on what we small islands must do together not only in monitoring and measuring of the factors and parameters of global warming and sea level rise but also in convincing the industrialised nations who are mainly responsible for global warming to change their attitudes and practices and to be fully committed to the global efforts to reduce or eliminate altogether the predicted threats of global warming and sea-level rising especially on our small, low-lying atolls"

He also expected that both the workshop and meeting will serve to remind the small island countries represented here of their obligations under the UN Framework Convention on Climate Change indicating that "We in Kiribati are fully committed to the convention and we will do whatever we can to support every initiative that is realistic, appropriate, practical and effective in the fight against global warming and sea-level rise"

President Tito concluded his address by stressing that "the fight against global warming and sea level rise would be in vain if the nations responsible for the problem do not commit themselves to the objectives of the Convention on Climate Change" and by wishing all participants a very successful workshop and meeting that he had great pleasure in declaring open.

## 4. WORKSHOP THEME SUMMARIES

### 4.1 Coastal Erosion

Chair: Tererei Abete (Kiribati)

Coastal erosion is a particularly serious problem for atoll states and low-lying islands at the present time and it is a problem that will be exacerbated by sea-level rise and climate change in the future. The causes of coastal erosion are complex and on atolls coastal erosion occurs on both ocean and lagoon shores. Simple models relating sea-level rise and coastal erosion developed for coasts elsewhere do not seem all that applicable in atoll situations. Similarly conventional response measures to protect island shorelines have not always been very successful and on narrow reef islands retreat from the shore is not a realistic option. The importance of local knowledge and understanding of atoll environments should not be underestimated and greater consideration should be given to the involvement of local people in producing inventories, determining the causes of coastal erosion in atoll environments and in deciding what response measures are appropriate.

In this session two papers were scheduled to be presented one emphasising past measures used to combat coastal erosion and the second on the process that the Kiribati Government was using to undertake an inventory of coastal erosion on the outer islands and on its causes and possible solutions. In the event only the first paper was delivered, although it is hoped that the second paper *Inventory of coastal erosion problems and contemporary responses in Kiribati* will be available for publication in the SPREP publication.

Presentation:

Seluka Seluka (Tuvalu)

*Traditional and Historical Responses to Coastal Erosion in Tuvalu*

The many natural and 'man-made' causes of coastal erosion and the traditional and conventional responses to coastal erosion in Tuvalu were outlined. Traditional measures include the construction of coconut leaf walls, coconut fibre stone units, wooden walls, stone walls, fish traps, wooden platforms, and trees. Frequently the measures are multi-purpose and integrated systems are often used. Traditional methods are low cost in terms of materials. The technology and expertise is readily available and whole families and communities are often involved in their implementation.

Conventional coastal protection systems which include gabion basket, concrete blocks and concrete walls, were also discussed but there is a high initial cost (often covered in a donor project) as well as high maintenance cost (not covered by the donor). In addition there are problems relating to the availability of materials, the removal of which may have serious environmental, particularly erosional impacts.

The need for flexible approaches and a full understanding of the situation at any particular place was emphasised. The problems created by expensive structures with high management costs need to be avoided.

Recommendations included:

- determination of appropriate sources for aggregate



- restrictions on the removal of aggregate from inappropriate sources
- Government housing policies encouraging building of wooden rather than concrete houses to reduce use of precious sand, stones and gravel
- encouragement of the use of local trees in coastal protection, including assistance from Agricultural Departments in provision of seeds and raising and planting of seedlings in the field
- emphasis and training on adoption of integrated systems
- sharing of expertise and technology between Pacific countries
- use of Environmental Impact Assessment for projects that could cause coastal impacts
- establishment of National Committees for Coastal Zone Management to be responsible for national and island level projects
- establishment of a national agroforestry program including usage of traditional, multi-purpose plants and trees for coastal erosion protection

Discussion:

There was widespread agreement with the points made by Mr Seluka. The need for more detailed investigation of the range of traditional response methods was highlighted, as was the importance of knowledge of coastal resources and erosion for both urban centres and outer islands and atolls.

Participants were concerned that increases in the frequency of strong storms and particularly high spring tides are contributing to increased coastal erosion and growing community concern. The importance of establishing Environmental Impact Assessment for proposals likely to impact on coastal areas was emphasised.

## 4.2 Management of Water Resources

Chair: Asher Edwards (Federated States of Micronesia)

Water resources of atolls are highly climate sensitive, dependant upon rainfall, extent of groundwater recharge, island dimensions and area of catchment. As a result of limited land area, increasing urban populations and sometimes highly variable rainfall, the availability of sufficient water quantity for increasing populations is a critical and worsening problem. With limited resources and increasing population concentrations, contamination of groundwater is a serious issue.

The following papers were presented on this topic in this session:

“Water Resources in the Atolls of the Republic of the Marshall Islands” by Abraham Hicking

“Water Resources in the Atolls of the Cook Islands” by Ben Parakoti

An additional paper - “Water Resources in the Atolls of Kiribati” by Baranika Kamaie - was presented on the following day.

Presentations:

Abraham Hicking

*"Water Resources in the Atolls of the Republic of the Marshall Islands"*

Traditional and present day management of water resources were outlined and methods for protection highlighted. In the past preferred village sites were located where water was most plentiful and fresh. Tree planting near the shoreline was used to reduce salt spray and overwash. Human wastes were disposed at the shoreline to be washed away by the tide and most burial was done at sea.

In the present, however, groundwater is at risk of contamination from sewage and waste management and on land burials. Atoll groundwater is also at risk of saltwater intrusion from both lagoon and ocean sides with rise in sea levels, overwash from storms and high tides into taro pits and other depressions and overdrawal. There are attempts being made to protect water resources and improve public knowledge of behaviour needed to protect water. Proper water resource management would require better data sets for climate, water recharge and withdrawal rates, current demand, projections of future demand, water quality and scenarios for the impact of climate change.

Ben Parakoti

*“Water Resources in the Atolls of the Cook Islands”*

Water resource management for the seven inhabited atolls in the northern Cook Islands was discussed. The average rainfall of 2000 mm/yr is viewed as sufficient, for reliance on roof catchments for the comparatively small populations of these islands. Groundwater is viewed as of very limited capacity. Both private and communal rainwater tanks have been provided. Agricultural activity is limited and industrial activity virtually absent, so the main use is domestic. The high island of the capital Raratonga is, however, in a different situation. Here, population pressures on water resources are escalating.

Discussion:

The following points emerged from the discussion:

1. Although the water resource problems of urban centres on atolls have been recognised and there have been a range of programs targeted at reducing those problems, water supply problems and contamination of water resources remain critical issues for many atoll countries. Population increases in urban centres are worsening these problems.
2. Atoll countries rely on different sources of water - some largely groundwater, others mainly rainwater catchment and others combinations of both of these. In addition different sources may be of differing importance in urbanised locations as compared to outer atolls. In some urban situations desalination plants have been used as a supplementary source and they are a prime water source in the Maldives. The cost of running desalination plants and their extensive maintenance requirements, however, reduces their feasibility for many areas.
3. Protection of water supply on outer islands and atolls is essential to maintenance of living conditions in these environments and to any efforts to slow the drift to urban centres or institute resettlement and decentralisation programs. Protection of water resources requires assessment of resources, removal and avoidance of activities which can contaminate groundwater and strategies to protect and enhance both rainwater and groundwater supplies.

4. Data sets needed for water management include social and demographic information as well as water inventory and budget information. Adequate water planning will require combined consideration of current demand and projections of future increases in demand with climatic information, water recharge rates under differing conditions, rates of withdrawal, vulnerability of the source to climate change and water quality.
5. In some situations differing components of water system and supply are managed by different organisations and data collected may be held separately. There have been a number of studies of specific aspects of water resources. However, information and frameworks for comprehensive assessment and planning is frequently absent.
6. Establishment, rehabilitation or upgrading of water catchment and distribution systems need to ensure that both capital and ongoing needs are met. Planning to meet capital and maintenance needs in the isolated and corrosive environments of atoll countries is a necessity. In the past supply infrastructure has been built with inadequate attention to ongoing maintenance needs, or to the particular nature of atoll environments.

Baranika Kamaie

*“Water Resources in the Atolls of Kiribati”*

The nature of groundwater resources in the atolls of Kiribati was discussed and the serious problems facing water resource managers were highlighted. The groundwater resource providing the main source for the capital, Tarawa, is limited and fragile. Most focus is on groundwater, with rainwater tanks a supplementary supply in some areas only and seen as too expensive for more widespread use.

High sea levels could lead to thinning of the lens, reduced quantity and saltwater intrusion. This would worsen the problems of already existing water shortage and contamination. Housing built on water reserve areas also contributes to groundwater contamination.

On outer islands there is a lack of community based management for sustainability. Hand and solar pumps have been provided on outer atolls but training and ongoing maintenance are essential.

Recommendations:

- a simple public education program is needed including the use of radio, newsletters in plain language
- more research on water issues is needed and in particular research to determine source of hydrogen sulphide
- long term planning and construction on long term facilities
- consideration of desalination plant as alternative

Discussion:

The issue of pollution of water by hydrogen sulphide was discussed, with some participants expressing the opinion that use of the water under these conditions represented significant risk. Combinations of chlorine and organic matter are capable of increasing toxicity and contributing to carcinogenesis. Although the Public Utilities Board is undertaking some water treatment, the source of contamination is not known.

Salt intrusion into groundwater can result in poor health of vegetation, including breadfruit and coconut trees. The cause of tree decline in South Tarawa has, however, not been isolated.

#### **4.3: Environmental Policy and Planning**

Chair: Seluka Seluka (Tuvalu)

The geography and nature of atolls makes them particularly vulnerable to impacts from human activity including development projects. For this reason, atolls require a sound framework and legislation for environmental planning and policy. Typical development projects on atoll islands include deep sea wharves and jetties, navigable channels, waste disposal, seawall construction, hotels, airstrips and roads, the impacts of which need to be considered in both the short- and long- term.

The following papers were presented on this topic:

“Project Assessment Processes and Environmental Impact Legislation in the Republic of the Marshall Islands” by Anawes Elias

“Assessment of the Environmental Consequences of Projects in Tuvalu” by Filipino Taulima presented by Tuisinga Saitala

“Integrated Natural Resources Planning in Torres Strait” by Vic McGrath

Presentation Summary:

Anawes Elias

*Project Assessment Processes and Environmental Impact Legislation in the Republic of the Marshall Islands*

The National Environment Protection Act 1984 of the Republic of the Marshall Islands regulates activities such as solid waste disposal and earthmoving and environmental impact assessment for development projects. Government projects are, however, not subject to EIA.

The need for technical support for the Environment Protection Agency was highlighted, particularly for management and assessment of earthmoving, solid waste, sea wall construction and evaluation of EIA. Recommendations included:

- in country training for EPA staff and local government in solid waste and hazardous waste management, in applying earth moving regulations, sea wall construction and evaluating EIA
- enhancement of education and public awareness programs
- review of landfill management and dump site
- encouragement of tertiary environmental science studies

Filipino Taulima (presented by Tuisinga Saitala)

*“Assessment of the Environmental Consequences of Projects in Tuvalu”*

The impacts of urbanisation and increasing population density were described and problems with shoreline development, coastal erosion and the removal of construction materials from the shoreline identified. The design limitations of coastal protection works at Funafuti and the interaction of cyclone storm surge and the wharf and Vaitupu were discussed. The wharf design is believed to have exacerbated flooding of the Vaitupu village. There is concern that the redesigned wharf will not solve these problems and may indeed worsen them.

Some possible response options include:

- decentralisation and encouragement of population movement away from Funafuti
- importation of pre-mix concrete to reduce aggregate demand
- use of timber and steel frames

Recommendations included that

- project design and assessment include competent and independent technical assessment and utilise local skill and knowledge
- legislation be developed for independent and impartial EIA
- a mandatory building code be introduced including requirements to keep the use of natural resources to a minimum, ensure public safety and structural stability
- controls over natural resource use by private landowners be introduced

Vic McGrath

### *“Integrated Natural Resources Planning in Torres Strait”*

The program to develop an Integrated Natural Resources Strategy for Torres Strait is in its preliminary stages, having commenced in September 1996. Work to date has been concentrated on refining the project outline, defining the actual work program and clarifying and determining working relationships with other environmental projects in the region to ensure a holistic and comprehensive approach is established.

Concerns about the effects of climate change in the region have certainly surfaced as important issues in past years. Recently, however, competing concerns requiring more immediate attention have tended to be given priority. The paper aimed to provide a better understanding of the physical and political complexities of living between two oceans, and on the border of two countries.

In addition the paper discussed the potential problems and longer term impacts of large engineering programs driven by pre determined budgets without cost components for comprehensive environmental impact studies

#### **4.4: Field Visits**

By courtesy of the Kiribati Government, field visits were made to:

- an ocean shoreline site to discuss and view field evidence of atoll development and geomorphology of relevance to climate change issues;
- the main water catchment area for the urban centre of South Tarawa to view the characteristics of the site, efforts towards groundwater protection and problems of compliance;
- the water pumping and filtration facilities to view their operation;
- erosion sites on the causeways to view construction type and impacts, high tide and wave damage and responses;
- the areas of high population density in Betio; and
- the harbour and wharves to view construction type, conditions and problems, wave and high tide damage and adjacent proposed reclamation areas.

Discussions and observations were led by Roger McLean, Baranika Kamaie, Eita Metai and Tererei Abete.

#### **4.5: Resettlement**

Chair: Anawes Elias

In this session the concern was not with questions of international migration. The emphasis was on processes and support needed for movement of peoples within and between atolls, which had been identified as high priority during phase one. Population movements have occurred in atoll countries over a long time period. The reasons for movement from small islands include population pressure, drought, epidemics, harassment or intimidation, religion, catastrophic climate events, depletion of natural resources, changed economic conditions and particular development projects. Migration from islands with limited health and education services and little cash employment opportunity has become common. This has led to overpopulation of urban centres and loss of skilled and younger people from outer island communities.

Various strategies to move people and decentralise activities are proposed and, in some cases implemented, to reduce population pressure and environmental stress on the limited terrestrial resources of atolls and as a response to the reduced capacity of particular islands to support population concentrations. Concern about climate change impacts is likely to lead to greater consideration of resettlement opportunities to reduce population and environmental stress. It is unlikely that all islands will be affected by sea level rise and climate change equally.

The following papers were presented on this topic:

“Resettlement in the Federated States of Micronesia” by Asher Edwards

“Resettlement Programs in Kiribati” by Kabure Temariti

“Resettlement in the Maldives” by Mohamed Ali

Presentations:

Asher Edwards

*"Resettlement in the Federated States of Micronesia"*

Resettlement experiences in the Federated States of Micronesia were outlined. It was noted that resettlement can be divided into two types - temporary or permanent, but that in a number of situations temporary resettlement becomes permanent.

There are memories still current of experiences of forced resettlement in the colonial period which were seen as cruel and disruptive to individuals and communities. Nowadays people are attracted to centres where schools and hospitals are located. After schooling and university, young people seek jobs at urban centres and then their parents and other relatives often follow. This is resulting in population pressure in these centres and loss of skills and people on outer islands.

Examples of migration activities were given for several states in the Federated States. In Yap there is migration between small islands and to the main island. Islanders have been kind enough to set aside land adjacent to hospitals and schools for small huts for visitors. These areas have, however, become increasingly populated, and, in many cases, are now permanently settled and overcrowded. On both the main island and some atolls in the state of Pohnpei, migration is contributing to overpopulation

There is also emigration for work purposes from FSM to Saipan and Guam . About one third of the population from Pinglap has moved to Guam and Saipan resulting in a significant loss of skills.

On islands which have lost population and in crowded urban centres, daily chores, previously part of the normal round of existence, are liable to be neglected with taro patches becoming overgrown with weeds and less time put into fishing for food. Reliance on the main food sources of the past have thus declined.

Kabure Temariti

*"Resettlement Programme in Kiribati"*

Both historic and present day resettlement programmes in Kiribati were discussed within the context of environmental conditions and population change. Scarcity of

resources, highly variable climatic conditions, the population concentrations in the Gilberts, particularly South Tarawa, population increase and the dispersed nature of country were highlighted as critical problems relevant to resettlement activities. Risk of natural disaster is also an important consideration. Whilst Kiribati is not in the cyclonic influence zone, it was noted that it is at risk of other natural disasters including coastal erosion, sea level rise, drought, epidemic disease, fire and tidal waves.

It was noted that resettlement in Kiribati is not a new strategy. The first organised resettlement programme was instigated by Maude in 1938 and concentrated on the southern Gilbert islands which were prone to drought and were becoming overpopulated. Successive droughts, however, undermined the continuation of the new communities and the resettled peoples were relocated to the Solomon Islands.

The current resettlement programme commenced in 1987 and has been sponsored by the New Zealand Government. It has been conducted in two phases with the objectives of

- relieving population pressure on islands in the Kiribati Groups; and
- stimulating and supporting the semi-subsistence sector

Particular constraints to the successful operation of the programme were identified. These included:

- political influence and a failure to give priority to moving people from most populated and drought prone islands;
- infrastructural problems such as inadequate transport and communication, medical services, school facilities, transit housing, land-use planning and lack of provision of tools and equipment;
- administrative problems such as absence of selection criteria or guidelines, lack of clarity over land ownership and lack of administrative facilities; and
- significant financial constraints, including a halt to donor contributions prior to the completion of the programme.

These constraints need immediate attention for the scheme to accomplish its objectives.

There are, however, opportunities in resettlement. These include the creation of jobs, the promotion of self-reliance, improved wealth distribution and expansion of the semi-subsistence sector. It was noted that despite the difficulties, infrastructure is now being improved on the receiving islands. The importance of external projects to economic activity for resettlers was, however, highlighted.

Requirements for successful resettlement activities were enumerated and include:

- good criteria for the selection of settlers
- capability assessment of the islands to be settled
- well established infrastructure
- socio economic and environmental impact assessment of the resettlement scheme for both source and receiving islands

Mohammed Ali

*" Resettlement in the Maldives "*

Four resettlement case studies from the Maldives were used to highlight resettlement issues and needs. It was noted that while the Maldives has no official resettlement



policy, various conditions, have lead to a range of resettlement projects. Some of these conditions are specific to the Maldives and some can be generalised to other countries.

Specific conditions include the large number of islands and the dispersed nature of settlements with 75% of the population, concentrated on islands of less than 1000 people. The demand for services in this situation leads to an enormous economic strain. There is, as a result, unofficial encouragement of resettlement with people supported to move to larger or medium sized population centres. It was noted, however, that while people wanted services, many people did not want to move.

Overpopulation on the capital island, Male, is a problem which is driving some resettlement activity and is one which the Maldives has in common with other atoll countries. The Government is attempting to reduce the pressure by establishing residences and Government offices on adjacent islands and opening up a number of nearby islands.

Difficulties associated with resettlement were discussed. Problems of integration between settlers and existing communities, lack of economic activity in some new locations and attachment to home island. These difficulties have resulted in the failure of some projects despite government subsidy and infrastructure provision.

There have, however, been projects where resettled people have apparently integrated and chosen to remain, even when return was later made available. Successful projects need adequate provision of services and infrastructure, but they also particularly need a situation in which new settlers are welcomed and their integration is supported and with economic opportunities.

It was noted that all resettlement activities discussed occurred within similar atoll environments and culture. The enormous increase in difficulties which would occur with resettlement attempts to different environments and cultures was emphasised.

Discussion:

Varying land tenure situations were discussed and it was noted that they could have a crucial impact on resettlement . Questions of whether the relocated group has rights to use the land or resources are of great importance. For example, if the relocated group was previously heavily dependent on marine resources, that group may be inclined or forced to poach marine resources from their new location. It was noted that resettlement can be a gradual process or occur almost immediately such as when residents were moved from Bikini Atoll and that involuntary resettlement can lead to bitterness and resentment.

In the future, sea level rise, increase in intensity and frequency of coastal storms or reduction in water resources may result in increased resettlement in atoll communities. Decision makers should be fully informed of the implications of resettlement well in advance of such an event. Decentralisation efforts currently underway can already be seen to have social and economic implications related to the whether the decentralisation is involuntary or voluntary, the comprehensiveness of pre planning and the cost impacts of the moves.

Past experience can highlight the magnitude of likely impacts. Comprehensive review of previous resettlement and decentralisation activities is required. Case studies of atolls in the

Pacific and the Maldives highlight the need for a range of information. This information includes:

- comprehensive environmental assessment of the resettlement location;
- documentation of the social, economic and environmental reasons underlying the decisions to resettle people;
- assessment of the potential impacts of the new population on natural resources, land and shoreline areas and or the removal of population from the original locality;
- socio-economic and cultural impact assessments for the area to be used and at the original locality
- infrastructure needs in the resettlement area,
- economic development potential; and
- availability of funds and other resources to assist with the resettlement process

#### **4. 6: Resources and Tools**

This session consisted of a panel introduction and small group discussions on the topics of coastal erosion, water resources and resettlement / decentralisation.

##### Coastal Erosion

The discussion emphasised the need for long term approaches and the need to move away from conventional and reactive responses. Problems with inadequate assessment of impacts from development, blasted reef channels and aggregate removal were highlighted. The group recommended consideration be given to

- trials using traditional and integrated approaches;
- establishment of local databases including local knowledge and expertise, historical responses, traditional and scientific knowledge, ownership, access and protocols;
- development of appropriate and comprehensive guidelines to assist with project management; and
- strategies to ensure evaluation of erosion potential and mitigation measures for all projects with potential impact
- development of appropriate building codes that seek to prevent damage occurring to property due to flooding and erosion

##### Water Resources

The discussion focussed on the need to:

###### 1. Maximise the resource through:

- supplying , where appropriate, rainwater catchments to provide drinking water
- facilitating groundwater recharge
- conservation and management of public use and demand
- developers enhancing catchment capability rather than relying on public water supplies
- developing policies to maintain/reduce populations for given areas to within the sustainable limits for water supply for the catchment and incorporate climate change impacts into calculations

###### 2. Reduce and prevent contamination through:

- improving wastewater and solid waste management
- educating the community to protect groundwater resources

### 3. Improving capability for:

- water budget assessments
- groundwater quality and quantity monitoring
- information collection and management including meteorological data, quantity, quality, public use and demand, for the present and for longer term planning

#### Resettlement/Decentralisation

The various events contributing to population movement in planned, unplanned and emergency situations were identified as including:

- extreme events such as hurricanes, flooding, earthquakes, storms, tidal waves
- climate change
- social/cultural and economic pressures and perceptions - health, education, housing
- overcrowding
- reduction or degradation of subsistence resources

The requirements to successfully move people into a new area were identified as:

- adequate infrastructure needs
- appropriate land tenure arrangements
- incentives and opportunities for economic activity
- willing volunteers

The need for appropriate guidelines, support and procedures for countries experiencing and/or facilitating population movements was highlighted.

#### **4. 7: Policy Setting for Response Measures**

Chair: Chalapan Kaluwin (SPREP)

In the late 1980s global warming and climate change were acknowledged as important international, regional and national issues by governments of the Pacific. International scientific groups such as the IPCC recognised that some of the greatest impacts would be felt on atolls and low islands.

The lack of resources and capacity in Pacific countries coupled with the requirements for reporting under international agreements has placed considerable pressure on governments of the small island states, though they recognise participation in international and regional fora is essential to protect their future well being. Assistance is required to enable small island countries to participate fully and to fulfil their reporting obligations. At the same time as fulfilling reporting obligations, it is critical for small island countries to be able to access resources and skills to undertake vulnerability assessments and respond to impacts.

The following papers were presented on this topic:

- “Processes of Climate Change Reporting to Kiribati Government” by Nakibae Teuatabo
- “Policy Setting in the Federated States of Micronesia” by Larry Raigetel

Presentation Summary:

Nakibae Teuatabo

## *Processes of Climate Change Reporting to Kiribati Government*

The history of sources of information that attracted the attention of the Kiribati governments to the potential impacts of the greenhouse effect and sea level rise during the 1980s were outlined. Several issues were identified that had been reported to government and that required activities at the international and regional level and action within Kiribati borders. Initially there were a number of difficulties including getting reliable scientific projections, identifying impacts and vulnerabilities and the lack of locally available expertise and resources. Some of the difficulties were overcome with the establishment of the Environment Unit, inputs from other projects such as the National Environment Management Strategy and participation in the IPCC process and Country Study Team. Past and potential contribution to the UN Framework Convention on Climate Change were highlighted. A series of recommendations concluded the presentation.

Larry Raigetal

*Policy Setting in the Federated States of Micronesia*

### Discussion

In discussion it was agreed that reporting to and by governments is a useful part in the process of programme planning for climate change which needs to be based on co-operation between regional organisations, governments, experts and communities.

Serious gaps were identified including

- \_ lack of institutional capacity and local expertise to deal with technical and policy issues;
- \_ lack of financial resources and in-country based expertise to participate in international and regional fora including those of the IPCC and FCCC;
- \_ lack of long term scientific data and information to assist in developing national and regional climate change scenarios; and
- \_ lack of information in local languages for public awareness programs and to assist community contribution to reporting processes.

The discussion highlighted that atoll nations share many common problems and issues. Participants agreed that there were significant advantages to their countries in sharing expertise, information and approaches to reporting and to vulnerability assessment and response. It was acknowledged that one of the objectives of this workshop was to assist in this process. It was agreed that establishment of mechanisms for continuing cooperation and consultation between atoll states and low islands is essential. The present initiative could serve as an example.

## **5 FUTURE DIRECTIONS**

### **5.1 Phase Three Planning**

During the workshop presentations and discussions, a number of other projects dealing with climate change and vulnerability in this region were discussed, including the Pacific Islands Climate Change Assistance Programme (PICCAP), Climate Change Training (CC:TRAIN), funded by the Global Environmental Facility (GEF), US Country Studies, Japanese Vulnerability Studies and other related SPREP and SOPAC activities. It was felt that all the atoll nations in the workshop would benefit from these programmes, but in different ways depending on their specific needs.

As discussed with participants during the workshop, the present Initiative, coordinated by both SPREP and Australia, has limited funds for the planning and implementation of Phase 3. Nevertheless, planning for phase 3 has been undertaken utilising the results of both phase one and phase two and after giving consideration to related projects such as PICCAP, CC: Train and the US Country Studies Program.

The workshop agreed that phase 3 should include:

- targeted training activities using resource people from within and/or outside the region. Where possible, resource people would be recruited from the participants of phase 1 and 2 of the initiative;
- identification of particular issues needing further attention but beyond the scope of phase three of this initiative.

There was also agreement that projects should:

- maximise the possibility of exchanges between participants and the involvement of specific resource people;
- be based on building the confidence and skills of in country staff; and
- use and build upon existing policy, practices and skills within the region.

Funding should be sought to supplement that currently available for phase three. This funding could be used for the training activities identified below and, potentially, for additional targeted training activities as identified during phases one and two.

### **5.2 Phase Three Projects**

Identified projects include to:

1. assist and train staff to identify and prioritise coastal issues on outer islands and to develop locally acceptable response measures. This project would be appropriate to the Federated States of Micronesia.

2. assist environment staff from atoll countries in:

- the development and application of impact assessment; and
- data analysis and management

This project would be appropriate to the Republic of the Marshall Islands.

3. support training activities on the integrated management of water resources both in densely populated urban centres and on outer islands, taking into account climate change and sea level rise. This project would be appropriate to the Republic of Kiribati.

4. assist in training atoll and low island staff to identify a range of appropriate response measures and adaptations to minimise the impacts from extreme events, such as particularly high tides, high seas, storm surges and tsunamis (tidal waves). This project would be appropriate to the region as a whole.

The above projects will be developed in consultation with participants from atoll countries and consideration given to additional proposals which may be identified during this consultation.

The outcomes of the initiative should be reviewed and particular issues needing further attention identified. It was agreed the outcomes and review of the initiative should be reported to participants, SPREP, Environment Australia and to relevant regional fora.