

COOK ISLANDS COUNTRY PAPER

TRANSFER OF TECHNOLOGY CONSULTATIVE PROCESS (DECISION 4/CP.4) ASIA AND THE PACIFIC REGIONAL WORKSHOP

Lapu-Lapu City, Cebu, Philippines
17-19 January 2000

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Waterfront Mactan Island Hotel and Casino
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I INTRODUCTION

Geography

The Cook Islands comprises 15¹ small islands scattered over some 1.8 million square kilometres of the South Pacific Ocean between Samoa and Tonga on the west and French Polynesia on the east. Their location is between latitudes 9 degrees and 22 degrees south and longitudes 157 degrees and 166 degrees west. The total land area is 240 square kilometres with over 88 per cent (214 sq. km) of the land area in the Southern Group.

The Cook Islands lie within the extensive and persistent trade wind zone of the South Pacific and enjoy a mild maritime climate with a pronounced wet season (November to April) where two thirds of the annual rain falls, and a dry season (May to October).

The islands represent the five different island systems found in the Pacific Basin: high volcanic; low volcanic surrounded by a raised reef platform or makatea, volcanic partially submerged with a large atoll-type lagoon or almost-atoll; the true atolls; and sand-cays. The low-lying islands have a height range above mean sea level of 5 to 9 meters. Rarotonga is both the largest island (67.2 sq. km) and the highest island (652 meters above mean sea level). With the exception of Manuae and Takutea all islands of the Cook Islands are inhabited.

History

The Cook Islands became a British Protectorate in 1888 administered by New Zealand and was annexed to New Zealand in 1901. The Cook Islands became a state in free association with New Zealand in 1965.

Her Majesty the Queen Elizabeth II is the Head of State of the Cook Islands. The Queens Representative, who is appointed on the advice of the Cook Islands Government, represents Her Majesty in the Cook Islands.

Cook Islanders are able to freely live and work in New Zealand, due to their having New Zealand citizenship.

¹ Rarotonga, Mangaia, Aitutaki, Mauke, Mitiaro, Atiu, Takutea, Manuae, Suwarrow, Rakahanga, Palmerston, Manihiki, Penrhyn, Pukapuka, Rakahanga

Governance

The Parliament of the Cook Islands consists of 25 members elected by secret ballot under a system of universal suffrage. The 1980-81 Constitutional amendments created an overseas constituency, which includes New Zealand and all other areas outside the Cook Islands.

The general direction and control of the Executive Government rests with a Cabinet of Ministers, comprising the Prime Minister and up to five other Ministers, appointed from amongst members of Parliament. One additional Minister may be appointed from outside of Parliament.

Traditional Leaders

The Constitution provides for the establishment of the House of *Ariki* (chiefs) comprising *Ariki* representing both the Outer Islands and Rarotonga. The function of the House is to consider matters relating to the welfare of the people of the Cook Islands as may be submitted to it by Parliament and to express its opinion and to make recommendations thereon including any question affecting the customs and traditional practises of the Cook Islands.

A further traditional body known as the *Koutu Nui* has also been established to provide *Mataiapo* and *Rangatira* (sub chiefs) of each of the tribes an opportunity to take part in the decision making process of government.

Economic Activities

The population and economic activities are concentrated in the coastal zones and therefore vulnerable to climate change or the potential impacts of sea level rise. Tourism is the Cook Islands major income earner and is reliant on the islands natural beauty. Other economic activities such as agriculture and fisheries remain small contributors to the national cake but still play a major role in supplying local market needs and ensuring balanced diets are maintained.

Marine resources are one of the Cook Islands least exploited natural resources. The production and farming of black pearls and pearl shell from the Northern Group islands is the second most important sector after tourism and is forecast to increase substantially over the next 10 years.

Electricity generation for the Cook Islands is heavily dependent on imported petroleum products. The Government is committed to providing all households with 24-hour electricity and today 98 percent of homes in the Cook Islands have electricity.

Water resources are a major concern for the Cook Islands with no water reservoirs available on any of the 15 islands. The main source of water is from stream, roof catchment systems, bore holes and private or community water tanks.

The biodiversity of the Cook Islands is relatively small with indigenous flowering plants and birds mainly in the Southern Group islands and fewer numbers in the Northern Group where there is decreasing habitat complexity.

II PACIFIC ISLAND CLIMATE CHANGE ASSISTANCE PROGRAMME

The Pacific Islands Climate Change Assistance Programme (“PICCAP”) is a three-year Project, which is scheduled to complete its work in June 2000. The Project is being funded by the Global Environment Facility (“GEF”) and is being implemented by the United Nations Development Programme (“UNDP”) which in turn has contracted the South Pacific Regional Environment Programme (“SPREP”) to execute the Project.

PICCAP was established to enable Pacific Island countries to meet their reporting obligations under the United Nations Framework Convention on Climate Change (“UNFCCC”). The project aims to build capacity in the region to advance national interests related to climate change, including capacity to more effectively pursue energy and natural resource management activities related to climate change abatement and adaptation.

Pacific island countries participating in PICCAP include the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Samoa, Solomon Islands, Tuvalu and Vanuatu².

III TECHNOLOGY NEEDS AND TECHNOLOGY NEEDS ASSESSMENTS

Technology information – What information on technologies is needed and how can this information best be identified, developed, stored, accessed, and provided to Parties?

(a) Given that there was no concerted effort to co-ordinate and/or organize climate change related activities until recently, combined with the lack of capacity, the Cook Islands has yet to conduct a specific technology needs assessment on climate change technology needs. Nevertheless, our capacity building needs have been identified in the Cook Islands Initial National Communication to the United Nations Framework Convention on Climate Change³.

(b) The Cook Islands is hindered by a lack of quantitative data, limited scientific capabilities, and limited studies or absence of previous literature and information, and limited understanding of the effects of climate change and sea level change in the islands. Therefore, qualitative statements are made in this report from a very limited resource.

² Niue and Papua New Guinea are participating with their own funds.

³ presented to the Fifth session of the Conference of the Parties held in October-November 1999 in Bonn

(c) The following key sectors likely to be affected by climate change and sea level rise and requiring urgent assistance have been identified in the National Communication:

- *Coastal zone and coral reefs*
- *Agriculture, food security and diet*
- *Marine resources*
- *Water resources*
- *Biodiversity*
- *Energy*
- *Meteorological services*

(d) For the Cook Islands to respond successfully and implement appropriate adaptation strategies, information gaps and capacity building requirements that must be addressed have been identified for each major sector

(e) In general, the Cook Islands would be interested in obtaining more information on both “hard” and “soft” technology options, such as know-how, practices and related capacity building.

1. Coastal zone and coral reefs

Information Gaps

- Knowledge of the change in beach profiles and the causal factors
- Understanding of the effects of coastal developments and structures
- The effect of sea level rise on the coastal foreshore - natural and developed
- Measures to develop and enforce legislation relating to the coastal zone
- Methods of development and implementation of integrated management plans
- Understanding coastal protection options

Technology Needs

- Appropriate and properly constructed coastal protection systems
- Effective and appropriate environmental impact assessment techniques
- Effective water drainage system
- Appropriate building construction regulations

2. Agriculture, food security and diet

Information Gaps

- Understanding of areas most vulnerable to changes in weather patterns
- Understanding causal factors leading to insect and disease outbreaks

- Identification of most suitable plants, crops, varieties and cultivars to the effects of climate change
- Additional methods of quarantine to reduce further pests and diseases introduction
- Measures to understand land zoning and building policies
- Develop gene bank of plants
- Methods of development and implementation of integrated pest management
- Lack of up-to-date statistical and other information on plant/crop, livestock, and forest production

Technology Needs

- Biological pest control
- Maintenance of cross breeding programmes
- Development of climate change resistant seeds, cultivars and varieties

3. Water Resources

Information Gaps

- Identification of leakage's
- Water quality and chemical analysis monitoring
- Methods and measures to improve water distribution at all times
- Water consumption data
- Pipeline network data
- Lack of co-ordination between development and water distribution
- Methods to improve water storage and conservation

Technology Needs

- Appropriate and cost efficient water storage systems

4. Marine resources

Information Gaps

- Knowledge of circulation processes within lagoons and the influence of climate. This would assist in understanding oceanographic processes relevant to:
 - Pearl and mariculture production
 - Shallowing lagoons
 - Lagoon flushing
 - Lagoon temperature change
- Knowledge of the interactions between marine flora and fauna (including coral), and the effects of external influences on these species and their interactions. These effects could include local species extinction, changes in species dominance, species resilience (tolerance) to disturbance, species introductions and species substitutions.

- Increase knowledge of pelagic fisheries migration and recruitment patterns in our EEZ.
- Develop gene bank of marine flora/fauna.
- Model low diversity marine ecosystems.
- Understanding of ecosystem rejuvenation after implementation of traditional conservation management practices e.g. Ra'ui.
- Identify specific integrated effects affecting marine resources - e.g. coastal sedimentation from rainfall runoff through Avatiu Harbour⁴.

Technology needs

- Modelling of potential climate related impacts on marine flora and fauna and activities.

5. Biodiversity

Information Gaps

- Increase knowledge of bird, flora and fauna habitats
- Strengthen links between science and policy development/formulation
- Develop gene bank of marine flora/fauna
- Understanding of ecosystem rejuvenation after implementation of traditional conservation management practices
- Identify specific integrated effects affecting birds, flora and fauna
- Increase knowledge of birds, flora and fauna and the effects of external influences on these species and their interactions
- Continue to develop databases of traditional and indigenous uses related to biodiversity

Technology Needs

- Development of appropriate computer software for biodiversity data base⁵ to allow greater comprehension and accessibility by the public
- Assistance from taxonomy specialists

6. Energy

There are five energy-related projects being currently undertaken in the Cook Islands.

1. Energy saving lights bulbs have been installed in all private dwellings on the island of Mitiaro (project funded by the Forum Secretariat, Suva, Fiji).

⁴ The main harbour on Rarotonga

⁵ Currently has a listing of about 3,500 plants and animals

2. Wind power energy feasibility study completed, including identification of appropriate site for windmills (project funded by the Forum Secretariat, Suva, Fiji).
3. Coconut oil power generated system being tested on Rarotonga for the past three years.
4. Small hybrid pilot power systems (diesel/battery) being tested on three islands.

Information Gaps

- Cost efficient energy alternatives

Technology Needs

- “Soft” option alternatives to “hard” energy options
- After consultation with the CEO⁶ of *Te Aponga Uira o Tumu-Te-Varovaro* (the Rarotonga Electricity Authority) (“TAU”), it was noted that there have been many proposals for wind generation but he had not seen any reference to the combining of wind generation with a small diesel powered system. As a technology need, he requested information on how such a system would perform during quick wind speed changes.

7. Meteorological Services

Information Gaps

- Access to the best currently available information on variations in the weather
- Future scenario models of possible future climate and sea level changes on small island developing states
- Early storm surge warnings
- Early cyclone warnings
- Lack of data collection
- Identification of mechanisms for cost effective transfer of data

Technology Needs

- Global models on changes in climate and sea level arising from the enhanced greenhouse effect, that are as locally relevant as possible.

IV CAPACITY BUILDING NEEDS

What areas should be the focus of capacity building, and how should it be undertaken, e.g. what kinds of activities, programmes and institutional arrangements?

In general, appropriate technology transfer will only be successful if there is sufficient trained human resources in-country to operate and implement technology transfer.

⁶ Mr. Ron Bates

Where appropriate, greater use of experts with similar experiences within the region including sharing of resources should be encouraged. Training is always required to facilitate the successful implementation of technology transfer, which includes assistance in formulating, integrating and implementing technology development, including institutional arrangements.

1. Coastal Zone and coral reefs

- Training and equipment required for coastal and engineering surveying
- Education and awareness
- Legislation and policy
- Integrated management plans

2. Agriculture, Food Security and Diet

- Develop geographical information system (GIs)
- Update information on agricultural land use through application of GIS
- Continuous monitoring of insect and disease incidences and severity
- Integrated pest management systems
- Gather information from other countries and organisations on performance of plant cultivars/varieties under certain climatic conditions
- Education and awareness
- Gene bank development
- Develop hydroponics for the atolls

3. Marine Resources

- Increase physical oceanography expertise regionally.
- Deal with issues at the ecosystem level rather than single species.
- Increased environmental ocean modelling of tuna and other pelagic stocks.
- Training and equipment required
- Increase biological species database

4. Water Resources

- Education and awareness
- Training and equipment
- Geographical information systems development
- Legislation
- Metering and tariffs
- Groundwater management
- Mechanism for water development
- Improvement in water quality

5. Biodiversity

- Education and awareness
- Training – biodiversity data collection and analysis and field work on species distribution
- Increase biological species database
- Methods for ex-situ collections

6. Energy

- Education and awareness
- Training and equipment

7. Meteorological Services

- Education and awareness
- Training and equipment
- Data transfer systems

IV BARRIERS TO TECHNOLOGY TRANSFER

How should Parties promote the removal of barriers to technology transfer? Which barriers are a priority and what practical steps should be taken?

- Cost
- The problem of project size. Not many investors, companies may be interested in projects in the Cook Islands because of the small size of such projects
- Insufficient knowledge and funds to repair and maintain transferred technology
- The distance of the Cook Islands from the technology source leads to increased expense and adds to post-project support problems
- Inappropriate technology – may have to be adapted to suit local conditions and environment
- Relatively lower skill base of the Cook Islands compared to Annex I countries
Insufficient scientific capacity to analyze appropriateness of technology
- Insufficient research being conducted in-country
- Government priorities and policies may possibly be barriers
- In the global sense the Cook Islands greenhouse gas emissions are minuscule and therefore the “act locally, think globally” attitude needs to be encouraged here

V POSSIBLE ACTIONS AND INITIATIVES TO REMOVE BARRIERS

- Need financial assistance in certain areas – e.g. energy technology – wind generators, etc.

- Mainstreaming of climate change issues by developing media awareness programmes.
- Dissemination of information – e.g. papers compiled by the UNFCCC Secretariat to interested agencies in the Cook Islands such as the “*Technical Paper on Coastal adaptation strategies*” FCCC/CP/1999/1, 25 May 1999.
- Feasibility/evaluation studies being undertaken in conjunction with local experts to ensure appropriateness of technology.
- Targeted training and funding on only one or two technologies.

VI OPPORTUNITIES FOR INVESTMENT AND PRIVATE SECTOR PARTICIPATION

What role is the private sector playing in technology transfer? What additional role can the private sector play? What barriers prevent their greater participation?

Technology transfer involves a cost to consumers and therefore requires shared responsibilities of both private sector and government to take this into account, for example, user-pays policies will have to be introduced and/or assessed to ensure sustainability.

Where possible, technology transfer should be undertaken by the private sector with the support of Government. A Cook Islands resident has developed two types of coastal protection systems that are currently being tested.

Some areas identified include:

- Wind power
- RAP systems for homes instead of extending the electricity distribution system
- Demand Side Management technology to limit power demand
- Co-generation, i.e., the installation of a waste heat recovery boiler in the diesel engine exhaust to produce electricity via a steam turbine generator without any increase in the use of diesel fuel.

A Cook Islands resident in the private sector has developed an entirely new form of coastal armor that has recently undergone extensive wave tank testing in the University of New South Wales (Australia) Water Research laboratories. The test programme showed that significant features of the hydraulic performance of the units, especially under hurricane sea conditions, were extremely low wave run-up and reflection capabilities. This provides distinct advantages over more traditional coastal armor structures which include: lower crest elevations, less materials, and reduced overtopping volumes. The laboratories also reported that the units were of significant value to the sustainability of the coastal environment and had

the added advantage of being able to be configured as a recreational amenity. This new technology will soon be made available.⁷

VII ONGOING AND PLANNED TECHNOLOGY TRANSFER ACTIVITIES

Are existing bilateral and multilateral mechanisms for technology transfer sufficient? Are new mechanisms needed? If so, what are appropriate mechanisms for the transfer of technologies among Parties, in pursuance of Article 4.5 of the Convention?

- Work is currently being undertaken to identify bilateral and multilateral mechanisms for technology transfer as part of the Cook Islands National Implementation Strategy for climate change funded through PICCAP.
- Use of fuel treatment to improve diesel engine efficiency. A trial is in progress with the results expected late February 2000.
- Wind energy is being talked about a lot but there is nothing concrete.

VIII KEY ELEMENTS OF SUCCESSFUL TRANSFER OF TECHNOLOGY ACTIVITIES

- Greater and/or increased understanding and participation of local/host community
- Linkage between government's overall development plan/strategy
- Strengthen networks between regional organizations and international organizations which have access to information and analytical capacity
- Cost benefit analysis
- During design, planning and implementation, ensure that local and/or regional capacity is available to support the planning and management.
- Acknowledgement and incorporation of traditional knowledge where appropriate
- Proven technology, simple, adequate back up.

IX NOTABLE ELEMENTS OF A FRAMEWORK FOR MEANINGFUL AND EFFECTIVE ACTIONS TO ENHANCE IMPLEMENTATION OF ARTICLE 4.5 OF THE CONVENTION

- Continued dialogue via workshops like this between Annex I and non-Annex I Parties
- Improved awareness of technologies available

⁷ For more information, please contact Mr. Don Dorrell, Cook Islands Motor Centre Ltd., PO Box 74, Rarotonga, Cook Islands. Telephone: (682) 22 055, Fax: (682) 21 040. Email: info@motorcentre.co.ck

X CONCLUSION

To conclude, although the Cook Islands has yet to undertake a technology needs assessment, it is anticipated that the PICCAP Office will undertake this when developing our National Implementation Plan on climate change.

All seven key sectors identified training as a priority for capacity building. With regards to technology transfer, the impediments to successful transfer included cost and lack of knowledge.