nems

national environmental management strategies

Cook Islands

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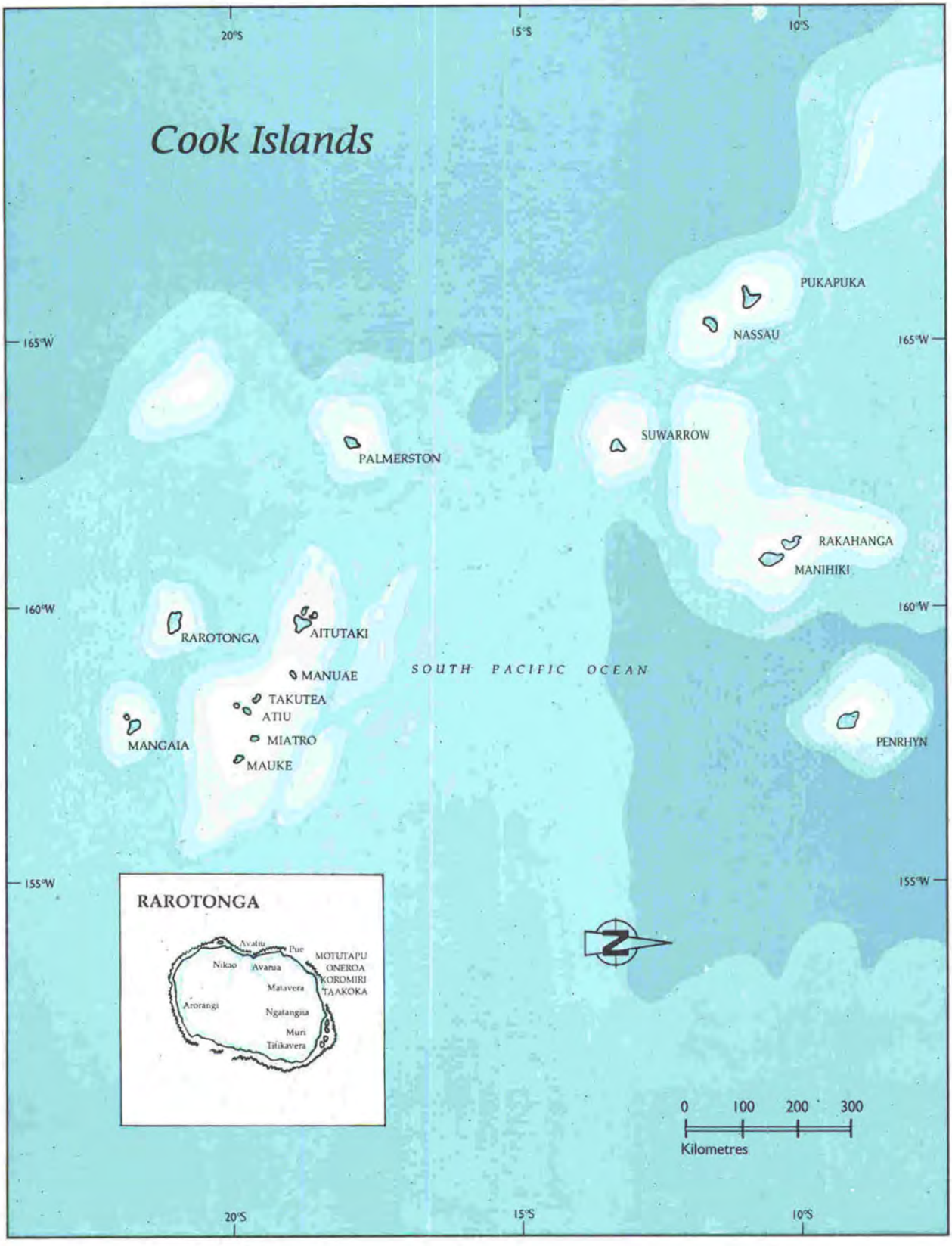
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SOUTH PACIFIC OCEAN
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Foreword

I am sure we recognise the importance of our environment to the future of the people of our Nation. We have very close cultural and emotional bonds to our land and environment by heritage — a heritage of which every Cook Islander is proud. Because of that pride in owning our land and environment, we all therefore must accept that we, today, are caretakers of our land and environment for the future generations of our people. To do this, careful nurturing, conservation and preservation of our environment, social and cultural heritage is critical to ensure that future econornic development of our country is sustainable or inline with the requirement to protect our environment. Economic development is also critical for the future well-being and survival of our Nation if we are to achieve total control of our future destiny by the 21st century.

All of us today must therefore pool our efforts to ensure that the preservation of our enviromnent and the development of our country move hand in hand for the betterment of our future.

We are indeed fortunate our environment is still a relatively healthy one, despite the past mistakes we have made through unsound land management and developmental activities. However, we cannot be complacent because development is moving rapidly as we approach the 21st century and we must now develop clear environmental legislation, policies and strategies to guide our developmental activities to ensure that our future development is truly sustainable.

In March, 1992, the first ever Seminar on Environmental Management was held in the Cook Islands under the sponsorship of the Asian Development Bank's Regional Environmental Technical Assistance Project (RETA) and the technical assistance of the South Pacific Regional Environment Programme (SPREP).

The Government had previously established a Task Force on Environment and Development, comprising 14 representatives from Government, the Conservation Council and the Chamber of Commerce, under the Chairmanship of the Permanent Secretary of the Department of the Prime Minister, to direct the Cook Islands RETA Work Plan, including the development of National Environment Management Strategies. The Task Force also directed the preparation of our National Report to the United Nations Conference on Environment and Development held in Brazil in June 1992 (the "Earth Summit").

Following the Seminar on Environmental Management, the Task Force directed the preparation of a draft National Environmental Management Strategies document which includes the discussion and recommendations of the Seminar's working groups and plenary sessions. This draft was widely circulated for further comments from the various sectors of our Community and a final draft then prepared for review and endorsement by Cabinet.

I regard the development of these National Environmental Management Strategies as an important step in the process of focusing attention on our environmental problems. But the development of strategies and action programmes is only a first step. Beyond this, I see a lot of hard work for all of us if we are to bring these programmes to fruition. I am confident, however, that there is the necessary commitment amongst our people to meet the challenge.

Hon Vaine Tafrea
Minister of Environment
Cook Islands Government

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Document numbering system

The legal numbering system has been used in this report, that is:

(Level 1) 2;

(Level 2) 2.1;

(Level 3) 2.1.1; and

(Levels 4 and 5) without number.

In Part II, Level 1 indicates the broad Goal or Objective; Level 2 indicates the Strategy; and Level 3, the Programmes. Part III is a single chapter and has not been numbered.

* Programme profiles

In *Part II: Environmental action strategies & programmes* (Chapters 3 through 6), a number of Level 3 (Programmes) headings in the Contents are marked with an asterisk (*). This indicates that a programme profile has been prepared for that programme to a general format, required by donor agencies for project identification. The Programme profiles assist

early project development and hence may speed the implementation process. Programme profiles are attached as Appendix 1.

For those programmes NOT marked with an asterisk, either special funding action is not considered to be required, or the implementation of the programme is considered entirely a matter for the Cook Islands Government. In most cases, such programmes call for administrative action.

All currency amounts, unless specified otherwise, are in Cook Island dollars.

A fiscal year spans the period 1 July to 30 June; FY 1994 refers to the period 1993–1994.

Acknowledgements

These National Environmental Management Strategies have been prepared under the guidance of the Task Force on Environment and Development, with the strong personal support of its Chairman, Mr Tere Bishop, Acting Secretary of the Prime Minister's Department. The strategies and the action programrnes prepared for each strategy flowed primarily from the National Environmental Management Seminar in March 1992 on Rarotonga, which involved wide participation from senior officials of relevant CIG Ministries, and representatives from the Island Councils, Koutu Nui, some traditional leaders, and other non-governmental organisations. As much of the debate in the Seminar was conducted in the Maori language, the SPREP Team also took advantage of further post-seminar discussions to clarify issues raised.

As Chairman of the Task Force on Enviromnent and Development, Mr Bishop was the logical choice for the Chair, and the undoubted success of the Seminar was in no small way due to his excellent direction of its deliberations.

The Seminar was very much a participatory activity involving three workshop sessions. These workshops were the very core of the Seminar where most of the work was done on issue identification, strategy determination and programme development. The various leaders of these working groups made a major contribution to Seminar success through making good use of the limited time available. These group leaders were Mr Tony Utanga, Dr Takiora Ingram, Mr Kato Tama, Mr Rairi Rairi, Mr Teariki Rongo and Mr Tutai Manuela.

The local consultant engaged for the RETA who prepared the State of the Environment Report for the Cook Islands, Mr Teariki Rongo, presented, in his other capacity as Director of the Cook Islands Conservation Service, an illustrated overview which assisted discussion considerably. He was also instrumental in the organisation of the Seminar and arrangements made for Outer Island representatives to participate. To him we extend our personal thanks.

The SPREP Team who assisted the Seminar comprised David Sheppard, RETA Team Leader: Dr Bob Thistlethwaite, international environmental management adviser to SPREP for the RETA; Ms Mere Pulea, RETA legal adviser; and Ms Milena Bellini, a voluntary legal assistant for the RETA. To Bob Thistlethwaite fell the task of preparing the draft NEMS Report, while Mere Pulea and Milena Bellini conducted a legal review of the existing legislation which is relevant to environmental protection and management.

Lastly, we would thank the Minister for the Environment for his support for the conduct of the RETA and particularly for his opening address to the Seminar, which set the scene for the good work which followed.

David Sheppard
RETA Team Leader

Message from the ADB

The Asian Development Bank is pleased to associate in assisting one of the Pacific region's most ambitious undertakings — the preparation of National Environmental Management Strategies (NEMS) in a number of Pacific countries. This assistance has been provided through a Regional Technical Assistance grant to the South Pacific Regional Environment Programme (SPREP). The World Conservation Union (IUCN) has also collaborated in providing technical advisory services.

Our involvement reflects two factors. Firstly, our confidence in SPREP as the prime sub-regional environmental organisation in the South Pacific region. The Bank has been pleased by the way in which SPREP has co-operated closely with member governments in addressing environmental issues in island countries and by the calibre of SPREP's staff work as well as the work of the national task forces which guided the country level activities.

The second factor is a commitment by the Bank to sustainable development. We are acutely aware of the vital importance of economic development for the Pacific Island countries and are equally concerned for the limited natural resources and often fragile nature of the environment of these countries. It is thus critical that development continues, but in a manner which is truly sustainable ecologically. Only by following such a course of action can the quality of life currently enjoyed by Pacific people be assured for future generations.

The need for sustainable use of natural resources has been the underlying theme of the NEMS documents. The preparation of NEMS has been a challenging task and has involved a wide range of government and non-government organisations in each country. The nature of the issues and the complexity of the challenges faced have been great. As ever, Pacific countries have risen to the challenge and I believe the commitment shown in the development of the Strategies is a true reflection of the intimate bond which Pacific Island peoples have with their environment. Nonetheless, this "commitment" and "challenge" has now to be put to visible action programmes.

The Asian Development Bank welcomes the publication of the Nationwide Environmental Management Strategies for the Cook Islands. It is an important event for environmental management in the Cook Islands and the Bank will be pleased to consider ways and means of assisting with its implementation.

Dr Kazi F. Jalal
Chief, Office of the Environment
Asian Development Bank

Message from SPREP

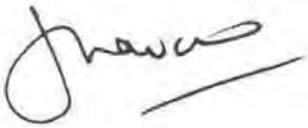
We Pacific Islanders share a common aspiration for economic development and improved living standards for our people. However, we are aware that this development cannot be at the cost of the environment. We have lived in close harmony with our island environment for thousands of years and we are well aware of its importance to our way of life. We face the complex challenge, in common with many other countries of the world, of achieving economic development in a way which will not significantly affect our environment. This major challenge must be addressed if our Pacific way of life is to survive.

The development of National Environmental Management Strategies (NEMS) has been a major tool in addressing these issues. This development was made possible through the generous financial and technical assistance of the Asian Development Bank and the World Conservation Union (IUCN). This assistance is gratefully acknowledged.

This NEMS is a practical document which aims to identify the major environmental issues in the Cook Islands and the priority environmental programmes which are required to address them. The emphasis has been on ownership of the NEMS by the government and people of the Cook Islands. The process which has resulted in the preparation of the NEMS has involved many participants and has been directed by a Task Force on Environment and Development, comprising relevant government and non-government organisations in the Cook Islands.

The NEMS process has proved most useful in raising awareness of environmental issues. In the wake of the United Nations Conference on Enviromnent and Development (UNCED) the NEMS also provides the foundation for implementing much of Agenda 21 in the Cook Islands. However, the success of the NEMS exercise will ultimately be judged by its implementation. If the NEMS report sits on a shelf and gathers dust, then the exercise has failed.

SPREP looks forward to working with the Cook Islands and with other regional and international organisations in the implementation of the NEMS.



Vili A. Fuavao
Director
South Pacific Regional Environment Prograrnme

Acronyms

ADB	Asian Development Bank
AOTA	advisory and operational technical assistance
ASPEI	Association of South Pacific Environment Institutions
CIATC	Cook Islands Advisory Technical Committee
CICC	Cook Islands Conservation Council
CICS	Cook Islands Conservation Service
CI$	Cook Islands dollar
CIG	Cook Islands Government
CITA	Cook Islands Tourist Authority
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COC	Chamber of Commerce
DOS	Department of Survey, Cook Islands Government
EC	European Community
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMA	environmental monitoring and assessment
EMP	environmental management plan
EMS	environmental management strategies
EPOC	ESCAP Pacific Operations Centre, Vanuatu
EPS	Department of Electric Power Supply, Cook Islands Government
ESCAP	Economic and Social Commission for Asia and the Pacific
ESS	environment sector strategies
FAO	Food and Agriculture Organisation, United Nations
FFA	Forum Fisheries Agency
GDP	gross domestic product
GLA	General Licensing Authority
GNP	gross national product
IUCN	World Conservation Union
JICA	Japan International Cooperation Agency
MED	Ministry of Education, Cook Islands Government
MMR	Ministry of Marine Resources, Cook Islands Government
MOA	Ministry of Agriculture, Cook Islands Government
MOF	Ministry of Finance, Cook Islands Government
MOH	Ministry of Health, Cook Islands Government
MOPED	Ministry of Planning and Economic Development, Cook Islands Government
MOW	Ministry of Works, Cook Islands Government
NES	National Emergency Services
NGO	non-governmental organistion
NZDSIR	New Zealand Department of Scientific and Industrial Research
NZODA	New Zealand Overseas Development Assistance
PHD	Public Health Department, Ministry of Health
PIDCs	Pacific Island Developing Countries
PSC	Public Service Commission, Cook Islands Government
RETA	Regional Environmental Technical Assistance Project
RETA Team	SPREP's Team of Resource Personnel for the RETA

SEE	socio-environmental evaluation
SOPAC	South Pacific Applied Geoscience Commisssion
SPC	South Pacific Commission
SPF	South Pacific Forum
SPREP	South Pacific Regional Environment Programme
TLT	Department of Trade, Labour and Transport, Cook Islands Government
TNC	The Nature Conservancy, United States
UNCED	United Nations Conference on Environment and Development, Brazil, June 1992
UNDP	United Nations Development Programme
UNDTCD	United Nations Department of Technical Co-operation and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Scientific and Cultural Organisation
USAID	United States Agency for International Development
USP	University of the South Pacific
WHO	United Nations World Health Organisation
WWF	World Wide Fund for Nature

Glossary for the Cook Islands

Ariki
A person who has been invested with the title or rank of office of Ariki in accordance with ancient custom.

Aronga Mana
This term applies to the group of traditional leaders (Ariki, Kavana, Mataiapo and Rangatira) of each district or village; of each island; and of the Cook Islands as a whole. For example, the District of Te-Au-O-Tonga (which is the Avarua area of Rarotonga) has its own Aronga Mana. On Rarotonga as a whole, there is an Aronga Mana comprising the Ariki, Mataiapo and Rangatira of Rarotonga's three districts. Each island within the Cook Islands similarly has an Aronga Mana.

Government Representative
A Representative appointed by Cabinet for each island, except for Takutea and Manuae. The Government Representative for Aitutaki is also responsible for Manuae.

House of Arikis
Under the Constitution of the Cook Islands, the House of Arikis is an advisory body, consisting of up to 15 Ariki who are appointed by the Queen's Representative, and which meets at least once a year. The House recommends on matters affecting the customs or traditions of the Cook Islands and considers any matters relative to the people's welfare submitted to it by the Legislative Assembly.

Kavana
A person entitled to hold office as a *kavana* in accordance with the custom of Mangaia in the Cook Islands.

Koutu Nui
The Kavana, Mataiapo and Rangatira of the Cook Islands may meet together when and where they wish. When meeting together, they are known as the Koutu Nui.

Mataiapo
A person entitled to hold office as a *mataiapo* in accordance with custom in the Cook Islands. This term applies to all islands.

Queen's Representative
The Head of State is Queen Elizabeth II, in whom all executive authority is vested. That authority is exercised through her appointed Representative.

Rangatira
A person entitled to hold office as a *rangatira* in accordance with custom in the Cook Islands. This term applies to all islands.

Executive summary

Background

In 1990, the Cook Islands Government (CIG) sought the assistance of the South Pacific Regional Environment Programme (SPREP) on a number of environmental initiatives. This led to the inclusion of the Cook Islands in a Regional Environmental Technical Assistance Project (RETA) which was being funded by the Asian Development Bank (ADB), with support of the World Conservation Union(IUCN), aimed to strengthen the environmental management capability of its Pacific Island member countries. The ADB appointed the SPREP as its executing agency for the RETA.

The major component of the RETA has been the development of National Environmental Management Strategies; other RETA components included the review of environmentally relevant legislation and strengthening of environmental institutions in the five countries, and the conduct of a series of training workshops on Environmental Impact Assessment (EIA) throughout the region. The implementation of all RETA components has been undertaken in a 30-month time frame with the development of NEMS being the most protracted and complex activity.

A RETA Work Plan was developed for each participating country. To oversee the development and implementation of the RETA Work Plan in the Cook Islands, the Prime Minister established a Task Force on Environment and Development comprising representatives of the Cook Islands Conservation Council, relevant ministries and a commercial organisation, under the Chairmanship of the Permanent Secretary of the Department of the Prime Minister. A Report on the State of the Environment for the Cook Islands was first prepared under the Task Force's guidance as a precursor to the planned conduct of a National Environmental Management Seminar on Rarotonga in March 1992, and the subsequent preparation of a draft NEMS report. The NEMS report was circulated for critical comment and then revised; this final report has been endorsed by the Task Force.

Overview of proposed strategies and programmes

The NEMS document presents four main operational goals, a set of 15 strategies, and 31 programmes, selected by participants at the National Environment Management Seminar as those to be pursued over the next five-year period in order to steer the Cook Islands towards an ultimate national objective of ecologically sustainable development.

Goals

Goal 1	Integrate environmental considerations in economic development
Goal 2	Improve environmental awareness and education
Goal 3	Manage & protect natural resources
Goal 4	Manage waste & control pollution

Strategies

Strategies for Goal 1

Strategy 1.1	Review & revise the legal framework
Strategy 1.2	Strengthen national environmental management
Strategy 1.3	Adopt Environmental Impact Assessment as routine procedure
Strategy 1.4	Use economic policies to help achieve sustainable development

Strategies for Goal 2

Strategy 2.1	Increase environmental training & public information activity

Strategy 2.2	Preserve traditional knowledge management systems

Strategies for Goal 3

Strategy 3.1	Support sustainable coastal resource use practices
Strategy 3.2	Support sustainable use of marine resources
Strategy 3.3	Support sustainable use of land resources
Strategy 3.4	Establish & manage protected areas

Strategies for Goal 4

Strategy 4.1	Improve disposal of solid wastes & sewage
Strategy 4.2	Improve supply of safe drinking water
Strategy 4.3	Anticipate pollution emergencies
Strategy 4.4	Use & abuse of hazardous chemicals
Strategy 4.5	Promote non-polluting forms of energy

Programmes

Of the 31 programmes developed, 26 would require the funding assistance of aid donors; for these, Prograrnme profiles have been presented in Appendix 1.

Goal I *Integrate environmental considerations in economic development*

There was considerable discussion at the Seminar on a proposed Bill for an Environment Act, which was being introduced to repeal the Conservation Act 1986–87. However, most discussion related to matters of definition and interpretation, rather than to the institutional framework and administrative process foreshadowed in the Bill; an Agency for the Environment, comprising an Environment Council and an Environment Service.

The new institutional arrangement builds on the existing framework in the Conservation Act 1986–87 of a Conservation Council and a Conservation Service. This NEMS supports the Bill's proposed institutional arrangement. But, as an interim measure, it advocates the continued operation of the Task Force on Environment and Development, with broadened representation (though constraining the number of Task Force members to a maximum of seven) and expanded policy development and advisory roles.

It was apparent at the Seminar that the Island Councils of the Outer Islands did not comprehend the degree to which their own by-laws were contributing to island Council ineffectiveness in dealing legally with environmental problems. Indeed, it became apparent from discussions with Island Councillors that some had little knowledge about their own by-laws. The draft Bill provides for Island Councils developing their own Island Conservation Plans; this would provide an opportunity for a revision of existing, environmentally relevant Council by-laws, and for the education of Island Council members and islanders on their by-laws.

The adoption of EIA as a routine administrative procedure was strongly advocated (although the use of the less emotive term of "socio-environmental appraisal", suggested by the Tourism Master Plan, was preferred by many workshop participants). The strategy developed for the application of the EIA process saw EIA applying throughout the Cook Islands to any development proposal which meets agreed criteria of being likely to have significant impact on the social, built or natural environment. It was considered vital that EIA should apply to both private and public

sectors, and also to all government policy development. A specific programme was framed for the development of national guidelines for the application of EIA, and of minimum national environmental standards for pollution control, including emission standards. From these, the Island Councils could develop their own standards if they so wished; but Island standards could not be less stringent than the national standards. Where an Island Council did not seek to establish its own standards, then the minimum national standards would apply.

While the NEMS has fully supported the retention of the Conservation Service (as an Environment Service under the proposed Bill for an Environment Act), a clear need was seen for a major increase in its technical and monitoring capacity. A number of NEMS programmes call expressly for funding of additional new staff positions, of which some would be counterparts to expatriate staff recruited to perform technical roles where the necessary skill or experience is not yet available in the Cook Islands. Additional positions would be required for periods ranging from one to three years, six for the CICS, and a further five in Ministries of Health (2), Agriculture (1), Marine Resources(1) and Education (1) in order to implement all NEMS programmes. A further short-term need is identified for a local economist to work with the Ministry of Finance. Three of the positions (2 in CICS and 1 in MOH) would be outposted to Manihiki.

The additional positions identified for the CICS do not include those already in the CICS recruitment pipeline for other projects, such as the FAO-funded National Soil Conservation Project.

One of the Government's recruitment criteria requires that local Cook Islanders are sought first to fill such positions. Only if the particular expertise required cannot be found within the Cook Islands would overseas recruitment action be undertaken. However, the engagement of expatriate staff may need to be sought for contract periods of one to six months for nine programmes, and one-year secondments for another three programmes.

One of the programmes which would require the engagement of both overseas and local consultants is a proposed investigation of the development of mechanisms for resource accounting for the Cook Islands, and the incorporation of the resource accounting concept in the appraisal of development proposals.

Goal 2 ***Improve environmental awareness & education***

This educational goal was of greatest concern to most Seminar participants, and this concern is reflected in the seven programmes generated to address the strategy. The highest-priority educational concern of Seminar participants was the preservation of traditional knowledge and practices, and the need for their incorporation, wherever feasible, into contemporary resource management practice. This became one strategy. The second strategy in this goal has been directed to raising the level of environmental education and public awareness throughout the country. A particular emphasis has been placed on the role which youth can play in the awareness-raising process, in the schools and in community youth organisations.

However, environmental education calls for information on the environment which is relevant to the Cook Islands. This information could take the form of written material including textbooks and reports, video, film, slides, tape recordings and preserved biological specimens. Such information is scarce; and much of what is available is of foreign origin with little local relevance. It is also not well indexed and therefore difficult to access. Programmes are directed to overcoming these deficiencies, including the necessary establishment within the CICS of an Environment Resource Centre to service the environmental information needs of the community, schools and government departments. Such a centre would also greatly facilitate the conduct of EIA of development proposals.

The Seminar also called for a continuing programme of workshops and seminars, not only for the general public, but for government resource officers, the Government's senior executive, and politicians themselves. This important need is also addressed through the proposed conduct biennially of a National Environment Conference (where progress on implementation of the NEMS could be reviewed, among other concerns), and through the incorporation of environmental training or information elements within most NEMS programmes.

Goal 3 ***Manage & protect natural resources***

As would be expected because of its breadth, the Seminar generated four strategies and eight programmes to address this goal. One programme addressed another facet of the public concern for preservation of traditional knowledge. Four targeted various aspects of protection of the coastal zone. One major programme aims at the development of an environmental management and monitoring plan for Manihiki Lagoon to protect the pearl-farming industry.

The remaining programmes also have strong economic overtones, reflecting the fact that the Seminar had a broad focus on sustainable development, and was not confined merely to consideration of the environment in isolation from economic reality. These programmes were directed to minimising overfishing of reefs and lagoons to protect the inshore fishery which is so important to everyday island life; a renewed search for an economically viable, alternative source of construction sand; and the development of tourism-based conservation areas.

Goal 4 ***Manage waste & control pollution***

The disposal of solid wastes and sewage is recognised as one of the most troublesome environmental problems in the Cook Islands and eight programmes were developed which aim to improve management and upgrade the level of protection. A feasibility study for a major future programme is directed at improved solid and liquid waste management on Rarotonga, in order to protect public health and the reputation of Cook Islands as a tourist destination. Four programmes are directed at the Northern Group. These include solid waste disposal, sanitation improvement, water storage, and solar electrification of another 140 house-holds.

The need for regular monitoring of water quality and of hazardous chemicals, particularly biocide residues and heavy metals, has been addressed by complementary programmes which would establish the baseline pollution values for water, and institute routine sampling of foods for analysis of chemical residues and other contaminants.

Implementation of strategies & programmes

The total estimated cost of the 26 fundable programmes identified by the NEMS is $7.795 million over a 5-year period, 1993–1997. Estimates of annual expenditure are $1.6, $2.557, $1.688, $1.44 and $0.51 million respectively for financial years 1993, 1994, 1995, 1996 and 1997.

Fifteen of these programmes are scheduled to commence in FY 1993, with another ten programmes in FY 1994. The remaining programme would commence in FY 1995. Twenty-four of the proposed programmes together comprise $4.295 million, or 55 per cent of the total estimated cost. The two programmes which constitute 45 per cent ($3.5 million) of the total are an Atoll Water Catchment and Storage Programme ($1.4 million), and a Northern Group Solar Electrification Programme ($2.1 million). It is possible these two programmes may be attractive for loan funding. Each of these two major programmes would contain significant purchases of capital items, provide opportunities for local private industry involvement, and have major social benefits. Both are directed at the relatively under-developed Northern Group.

Eleven programmes are short-term, not exceeding one year. Nine extend over two years, while six programmes would run over three years. Because of the lead time necessary for the implementation of larger, higher cost programmes, costs are expected to peak in FY 1994, when all except one of the programmes should be either completed or under way.

Of the 26 programmes, the CICS has been indicated as the likely executing agency for 12 programmes. Primary execution of the remaining programmes has been directed to the Crown Law Office (1), Ministry of Agriculture (3), Ministry of Education (1), Ministry of Finance (1), Ministry of Health (2), Ministry of Marine Resources (1), Ministry of Works (3), Island Councils (1) and a proposed Waste Management Authority. While it is to be expected that the Cook Islands Conservation Service would have prime responsibility for the implementation of the bulk of the NEMS programmes, proposed carriage for 14 programmes has been spread widely among Government Ministries and the Island Councils, although close consultation with the CICS would be expected. Implementation of the NEMS therefore will be a collective effort and not simply a matter to be left to the CICS. Such multi-disciplinary and intra-administration effort reinforces the importance of the continued central role of the Task Force on Environment and Development.

The appraisal of environmental proposals under this NEMS, the preparation of recommendations on strategy and programme priorities, proposed disbursement of available allocated funds, and the initiation of the search process for additional donor funding would, of course, be the first tasks of the Agency for the Environment (or the Task Force on Environment and Development).

However, the ultimate decision on priorities and allocation of funds rests with the Cook Islands Government. The degree to which it supports the NEMS will be manifest in its preparedness to support the CICS and other government agencies with environmental responsibilities with the financial and manpower resources necessary for the proper implementation of the NEMS. While Cabinet in determining policy is inundated with demands for funds from all quarters, the fundamental fact that the environment ultimately governs our lives, not the other way around, should always be borne in mind. It is also obvious that the sustainable development of a nation's resource base makes good business sense.

Review

These National Environmental Management Strategies are simply one snapshot in time. They have been framed in the context of the needs perceived by Cook Islanders today. Development is taking place so rapidly, however, that we can be sure changes to the NEMS will be needed even in the short term. An annual review of performance would be undertaken in the context of budget estimate preparations. Beyond that, a major review of the NEMS has been foreshadowed for late 1994 through the National Environment Conference, with preceding on-island and island-specific seminars on needed environmental strategies and programmes.

part I

The setting of the Cook Islands

Introduction

This introductory chapter briefly discusses the world scene in order to place subsequent discussion on the Cook Islands at national and island levels within a wider global perspective. The need for the development of National Environmental Management Strategies (NEMS) for the Cook Islands is then discussed in the light of the broad findings of the Report on the State of the Environment (SOE) in the Cook Islands. This leads on to a statement on the scope of this NEMS report.

1.1 The World Conservation Strategy

Ten years ago, the international organisations of the World Conservation Union (IUCN), United Nations Environment Programme (UNEP), and the World Wide Fund for Nature (WWF) published the *World Conservation Strategy* (1980). This strategy recognised that the pursuit of conservation could not be achieved globally without development to alleviate the poverty and misery of millions of people. This interdependence of conservation and development gave rise to the phrase "sustainable development". Its clear message is that if the planet's fertility and productivity are not protected, the future of the human race is at risk.

The World Conservation Strategy emphasised three objectives:

1) essential ecological processes and life-support systems must be maintained;
2) genetic diversity must be preserved; and
3) any use of species or ecosystems must be sustainable.

The 1987 report of the World Commission on Environment and Development brought to the environmental debate a clear understanding of the global interdependence between economic and environmental considerations. The year 1987 also saw the groundwork laid for preparations for the "Earth Summit", the United

Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in June 1992, for which the Cook Islands prepared a National Report.

Cook Islands presents its National Report to the Earth Summit, Brazil, June 1992. (photo courtesy of Cook Islands Conservation Service)

In October 1991 the IUCN, UNEP and WWF published in partnership *Caring for the Earth: A Strategy for Sustainable Living*. To quote from its Foreword (p. 2):

Caring for the Earth has been prepared through a wider process of consultation than was possible when we wrote the World Conservation Strategy a decade ago. It is intended to re-state current thinking about conservation and development in a way that will inform and encourage those who believe that people and nature are worth caring about and that their futures are intertwined. It is also intended to persuade people at all levels that they can do something or help cause something to be done, that will lead to a better care for the Earth.

The Earth, however, comprises a disparate array of geographical and political entities. Just as a global environmental picture must be constructed from an environmental mosaic of its country components, so should each country or nation be fully conscious of the potential global context of their environmental concerns and not lose sight of the prime objective of mankind—to protect the only home we have, the Earth.

Therefore, in the process of developing environmental management strategies for the Cook Islands, the issues raised in *Caring for the Earth* have been considered. Some of its strategy elements which are considered in harmony with discussion at the NEMS Seminar on Rarotonga have been adapted for incorporation in these National Environmental Management Strategies.

1.2 Why environmental management strategies for the Cook Islands?

Environmental management strategies are a means of integrating development and conservation considerations. Such strategies support economic development, not hinder it, providing that development is sustainable.

If the resources of a nation are considered as its capital investment in the future, any development which draws on the interest from that investment and does not touch the principal is fully sustainable. Sometimes it is necessary to draw on the invested capital in order to provide the necessary stimulus for the development of more wealth or short-term benefits; but the consequences of such capital-depleting actions, both for this generation and those to come, must be clearly understood.

Environmental management strategies are realistic only if they are derived in part from a wide participatory process of problem recognition, planning and policy generation across all levels of society. The strategies are realistic only if they are based on facts and are framed with time-bound action programmes, together, where possible, with specified indicators of achievement, in order to turn them into measurable results.

As the successful implementation of an environmental strategy depends largely on the co-operative action of the island communities, the consultation process is vital. If there is no consensus on a course of action, all the legal mechanisms in the world will prove ineffective. The strategy will not be "owned" by the community at large and, without such ownership, compliance is unlikely in any small, closely knit island society. This is especially so in the Cook Islands where land ownership is of crucial cultural importance, and the traditional right of owners to manage their land as they see fit is cherished.

Effective environmental management planning needs facts—on people, the economy, infrastructure, and natural resources, as well as facts on institutions, laws and policies which promote, or obstruct, sustainable development. Such information must be properly analysed, readily accessible, and routinely updated.

However, in most countries all the data desired for planning and decision making are rarely available, and the Cook Islands is no exception. Yet, however imperfect the database may be, there is no alternative but to use what is available to best effect. However, no action should be taken where considerable doubt exists about the safest course. As additional information is acquired, policies and programmes can be adjusted. Where policies or actions are based on seriously defective data, irreparable environmental damage may result; hence the need to acquire and upgrade data to reduce that risk is an urgent and continuing process, applying to most facets of the social, built and natural environments.

Available data on the environment of the Cook Islands have been examined recently and a report on the State of the Environment (SOE) prepared as a precursor to the preparation of these National Environmental Management Strategies. This SOE provides an excellent foundation, though it should be remembered that it cannot be better than the data on which it is based.

The SOE, in essence, indicated:

1) A principal concern of the Cook Islands is for proper management of the vital land resource, especially so in the coastal zone where degradation was clearly evident due to:

- soil erosion and resultant siltation of lagoon and reef;
- increased organic and nutrient levels arising from waste disposal and agricultural chemicals;
- unplanned infrastructure development at the foreshore; and
- mining of beach sand.

2) Other major national concerns are:

- the disposal of solid and liquid wastes;
- bad fishing practices;
- lack of protected area development; the need to conserve water and energy consumption; and
- the need to generate greater public awareness of these environmental concerns and their national impact.

3) Continuing international concerns are:

- the nuclear testing programme in neighbouring French Polynesia; and
- the indiscriminately destructive practice of driftnet fishing.

There have been a number of responses by both government and non-governmental sectors to environmental problems. The SOE points to official policies for environmental control and conservation included in the Manifesto of the governing Cook Islands Party (Appendix 2), and to the severe constraint on applying sound environmental policy and implementation of environmental administration through the failure of the main body of environmental legislation, the Conservation Act 1986–87. While internationally the Cook Islands is signatory to ten

conventions, at home the traditional conservation management system of *ra'ui* has become largely ineffective except on the Outer Islands of Pukapuka and Nassau.

The Cook Islands Conservation Service (CICS) is the body charged with the prime responsibility for environmental administration; at the same time a further seven institutions are developing their capacity for environmental protection within their own functional responsibilities: the Ministry of Marine Resources, the Ministry of Culture, the Curriculum Unit of the Education Department, the Forestry Division of the Ministry of Agriculture, the Ministry of Energy, the Water Supply Board and the Cook Islands Tourist Authority. These eight institutions together administer a range of environmental responses and are the executing agencies for a number of aid-funded programmes.

Many of these responses to environmental need, however, lack co-ordination because they were never designed to fit into an overall plan for managing the environment of the Cook Islands and, in some instances, are unlikely to have any lasting success because of lack of public support.

The scope of the environmental concerns is such that a wide range of further responses is required if sustainable development as an overall national goal is to have any prospect of being realised. Many of the responses called for have a degree of urgency, yet manpower and financial resources require the allocation of priorities; other responses depend in part on the prior successful completion of other programmed activity.

There is thus a clear need for the development of a set of National Environmental Management Strategies which provide a framework for sustainable development—a framework which is "owned" by the community and within which all can work in a co-ordinated and co-operative way towards a common goal.

1.3 Scope of this NEMS Report

These National Environmental Management Strategies (NEMS) are merely one snapshot in time of a set of strategies and programmes which will help the Cook Islands progress along its chosen path towards greater economic prosperity, but in a way which is ecologically sustainable in the long term.

Agreed strategies to achieve sustainable development are developed on the basis of information analysis, and through continued consultation and consensus building. The process of strategy development here has been based primarily on the discussion at the National Environment Management Strategies (NEMS) Seminar, where a range of strategies and programmes were developed by Seminar Working Groups. That development was placed within the context of the Cook Islands Manifesto and other recognised Government policy (Appendix 2). Due attention was also paid to recently formulated integrated island development plans and to other public information on Cook Islands development.

A Working Party at the NEMS Seminar at Rarotonga develops institutional strategies for strengthening environmental management. (photo courtesy of Cook Islands Conservation Service)

The NEMS Seminar itself included representatives of the various Island Councils who made a major input to the development of strategies and programmes. Further consultation with them and the island communities they represent will be a vital element in the review process for these NEMS. Further consultation with NGOs (particularly the main church organisations) must also be sought and their comment subsequently incorporated into the NEMS document. Only when this extended consultation process has been concluded could it be said with confidence that *National* Environmental Management Strategies have been prepared.

This NEMS report provides in Part I a brief overview of the environmental setting of the Cook Islands (Chapter 2). Readers seeking more detailed information should refer to the SOE itself, or to other readily available literature listed in the References.

Part II of the report presents the environmental action strategies and programmes which were developed within the course of the NEMS Seminar. It would have been possible to separate the presentation of strategies and programmes. However, since programmes are developed to give action to strategies, they have been kept together, but programme discussion confined to a brief overview.

More detailed information on most programmes (those marked with an asterisk *) is presented in the Programme profiles in Appendix 1. These profiles were separated from the main text partly because they would interrupt the presentation of the strategies. They are also directed at a different audience: Part II will be sought by policy planners and decision makers, while the Programme profiles themselves will be of particular interest to multilateral and bilateral donor agencies in the annual forward planning of their Country Programmes for development assistance.

Given the many limitations imposed on the Cook Islands Government (CIG) in manpower resources, finance, and physical infrastructure, these NEMS must necessarily be viewed from the long-term, ideal perspective. The number of proposed programmes and their estimated cost may seem high (see Part III, Estimated programme costs) but, in fact, considerable constraint was exercised in the selection of priority programmes. There are many more desirable programmes than are discussed in this report. When there are so many issues, each competing for funding, and with variations in the magnitude of various environmental problems between islands, the setting of priorities in accord with realistic funding availability is difficult. Finally, however, it is the prerogative of Parliament to determine its own priorities. In general, programmes have been framed within a realistic time horizon for planning of five years; the period 1993–1997.

In Part III the proposed programmes and their estimated costs are summarised and implementation issues briefly discussed. There is also brief comment on the need for future review of these NEMS in the context of preparation of future National Development Plans.

The setting

National Environmental Management Strategies must be formulated in the context of the overall natural, socio-economic, cultural and political environment. This chapter provides a brief overview of the Cook Islands in terms of its physical and biological features, people, and economy. It is not the intention to reproduce here the detailed information contained in the Report on the State of the Environment or in the earlier National Report to UNCED, but rather to provide only sufficient background material necessary for a reader to follow the discussion on environmental strategies.

2.1 Land & distribution

The Cook Islands comprises 15 small islands scattered over some 1.8 million sq km of the South Pacific Ocean between Western Samoa/Tonga on the west and French Polynesia on the east. Their location is between latitudes 9° and 22° South and longitudes 157° and 166° West. The islands are divided geographically and politically along a line between Palmerston and Suwarrow into a Northern Group (six islands) and a Southern Group (nine islands).

Above: The spectacularly beautiful high volcanic island of Rarotonga. (photo courtesy of Cook Islands Conservation Service)

Left: The beach at Aitutaki on one of the world's largest lagoons. (photo courtesy of Cook Islands Conservation Service)

Table 2.1 **Land area, type & elevation**

Island	Land area (sq km)	Type	Max. height above M.S.L. (m)
Southern group			
Rarotonga	67.2	High Volcanic	652
Mangaia	51.8	Low Volcanic (*Makatea*)	169
Atiu	26.9	Low Volcanic (*Makatea*)	72
Mitiaro	22.3	Low Volcanic (*Makatea*)	15
Mauke	18.4	Low Volcanic (*Makatea*)	29
Aitutaki	18.1	Almost Atoll	124
Manuae	6.9	Atoll	10
Palmerston*	2.0	Atoll	5
Takutea*	1.2	Sand-cay	5
Northern group			
Penrhyn*	9.8	Atoll	5
Manihiki*	5.4	Atoll	5
Pukapuka	4.3	Atoll	5
Rakahanga*	4.1	Atoll	5
Nassau	1.2	Sand-cay	9
Suwarrow	0.4	Atoll	5
Total area	240.0		

* Elevation assumed to be about 5 metres

Source: State of Environment Report, Table 1.0

The land area is 240 sq km, with over 88 per cent (214.8 sq km) of the land area in the Southern Group. The Exclusive Economic Zone (EEZ) of the Cook Islands is almost 2 million sq km.

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 (Table 2.1). Details of geologic and environmental features of each island are given in Table 2.2.

The low lying islands have a height range, above mean sea level, of 5–9 m. Rarotonga is both the largest (67.2 sq km) and highest island (652 m above mean sea level).

With the exception of Manuae, Takutea and Suwarrow, all islands of the Cook Islands are inhabited.

Table 2.2 **Geomorphologic & environmental features**

Southern group (214.8 sq km)	
Rarotonga	High volcanic (652 m); collapsed caldera; prominent monoliths in the interior; steeply dissected valleys with ridges separating four main valleys (Takuvaine, Avatiu, Avana and Rutaki); fringing reefs with varying widths from 400–800 m on the south coast to 50–100 m on the windward east coast; 4 sand-cay islets, 3 located on the eastern side, the other on the northern side; 1 volcanic islet; storm rubble prominent on the north and north/east coast with finer coral-sand on the south and south/east coastline. **Environmental features:** degradation of coastal zone and the Ngatangiia lagoon, reef silting from erosion; *Acanthaster* predation on reef; has wide ecological range from cloud forest on high peaks, to fernlands, and swamplands; rare and endangered species of the *kakerori* (Rarotonga flycatcher) and the *i'oi* (Rarotonga starling).
Mangaia	Low volcanic (169 m) surrounded by uplifted concentric coralline cliffs *(makatea)* rising to 80 m; volcanic plateau; swamplands at the inner wall of *makatea*; limestone caves; fringing reef, narrow reef flat. **Environmental features:** pronounced erosion of infertile fernlands and former pineapple production areas with siltation affecting *makatea* outlets and taro plantations; extensive cave system in *makatea*; swamplands; makatea wildlife and the rare *tanga'eo* (Mangaian kingfisher).

Atiu	Low volcanic (72 m) surrounded by *makatea* to 20 m; raised island; volcanic plateau; swamplands on the lower inland slopes; fringing reef, narrow reef flat. **Environmental features:** pronounced erosion features similar to Mangaia; limestone cliffs and caves; swamplands; *makatea* wildlife; and the *kopeka* (Atiu swiftlet).
Mitiaro	Low volcanic (15 m) surrounded by low *makatea* to less than 6 m; raised island; fringing reef with narrow reef flat; fresh water lake with outcropping fertile mounds. **Environmental features:** lake with fresh water eels; breeding area for the *kerearako* (Cook Islands warbler); has the few remaining sandalwood trees.
Mauke	Low volcanic (29 m) surrounded by *makatea* to 20 m; interior escarpment forming interior catchment area; uplifted island surrounded by a fringing reef with a narrow reef flat. **Environmental features:** interior escarpments; limestone cliffs and caves; swamplands; *makatea* wildlife.
Aitutaki	Volcanic (124 m) cone partially submerged rising from >4,000 m depth; barrier reef, large, 66 sq km lagoon, 10 sq km reef flat, plus 12 *motu*, with 2 volcanic islets, 1 sand cay. **Environmental features:** lagoon; *Acanthaster* predation on reef; pollution from agricultural chemicals; coastal zone; and breeding area for the *kuramo'o* (lorikeet).
Manuae	Atoll, 2 flat coral sand islets, shallow closed lagoon, surrounded by continuous reef with a single boat passage. **Environmental features:** turtle nesting site.
Palmerston	Atoll, elongated lagoon with 8 main islets surrounded by reef. **Environmental features:** major nesting ground for green turtle.
Takutea	Low lying elongated sand cay, surrounded by reef. **Environmental features:** major seabird breeding ground and turtle nesting site.

Northern group (25.2 sq km)

Manihiki	Atoll, pentagonal shape with 2 large isles and many islets. **Environmental features:** coastal zone, seabird breeding ground, turtle nesting and stocks of blacklip pearl oyster.
Pukapuka	Atoll, 3 islets surrounded by closed reef with artificial passage. **Environmental features:** green and hawksbill turtle nesting site, introduced blacklip pearl oyster and trochus.
Rakahanga	Atoll, rectangular shape of 9 islets surrounded by closed reef. **Environmental features:** green turtle nesting site.
Penryhn	Atoll, with 3 natural passages, largest lagoon. **Environmental features:** green and hawksbill turtle nesting site, natural stocks of blacklip pearl oyster.
Nassau	Sand cay, with a few dunes and narrow reef flat.
Suwarrow	Atoll, 22 vegetated islets, large 133 sq km lagoon, algal ridge; broad surrounding reef flat (100–800 m; active lagoon flushing; one natural passage. **Environmental features:** major seabird breeding area, turtle nesting site, natural stocks of blacklip pearl oyster, a National Park.

2.2 Governance

The Cook Islands became a British Protectorate in 1888 administered by New Zealand and annexed to New Zealand in 1901. The Cook Islands achieved self-government in 1965. Under its Constitution (1965) the Cook Islands has complete control over its own affairs, in free association with New Zealand. The Cook Islands can, at any time, move to full independence by an unilateral act if it so desires.

Executive authority is vested in Queen Elizabeth II, who is Head of State, and exercised through the Queen's Representative. Executive government is carried out by a Cabinet of a Prime Minister and up to eight Cabinet ministers including a Deputy to the Prime Minister. The Cabinet is collectively responsible to Parliament.

Parliament consists of 25 members who are elected by universal suffrage every five years, and is presided over by a Speaker. The House of Arikis comprises up to 15 members; it can advise the Government but has no legislative powers.

Each of the main islands, except Rarotonga, has an elected Island Council, with the Ariki as ex-officio

members, and a Government Representative appointed by Cabinet.

2.3 Physical Attributes

2.3.1 *Climate*

The SPCZ, or the South Pacific Convergence Zone, and its movement between the Northern and Southern Groups is an important phenomenon for influencing the weather patterns of the Cook Islands. The SPCZ is a convergence zone of air between the equatorial easterly winds and the south easterly trade winds. It varies from month to month, and the weather in the Southern Group is largely dependent on its position and intensity.

In general, the Cook Islands has a pleasant climate with an average humidity of 84 per cent, and total annual average of 2116 sunshine hours. Average rainfall varies from 1300–2800 mm per year with a dry season (May–October) average range of 740–865 mm for Rarotonga and Penrhyn respectively, and wet season (November–April) average of 1232–1296 mm. The average annual rainfall for Rarotonga is 2012 mm (1930–1989).

The average monthly temperature for the Northern Group is 28° C with little diurnal or inter-seasonal variation. The Southern Group has a wider temperature range with greater inter-seasonal variation, but even then with the lowest ever recorded mean monthly temperature for Rarotonga of 21.7° C for August. The peak average monthly temperatures for the Southern Group (27.1° C) are recorded for Aitutaki for February and March.

The formation of tropical cyclones in low pressure troughs in the SPCZ is a major climatic feature of the Southern Cooks during the wet season. The last major cyclone was "Sally" in January 1987. The Northern Group, however, is seldom affected by cyclones with 11 reported in the area between 1940 and the early 1980s and only 3 causing damage to some of the atolls (Thompson, 1986).

2.3.2 *Soils*

The soils of the atolls of the Northern Group are derived from coralline material, highly porous and inherently infertile. They are agriculturally capable of supporting only coconut and pandanus and, where sufficient humus has built up (generally in marsh depressions), pit taro *(pulaka)*.

Clouds build up for a tropical storm. (photo courtesy of Cook Islands Conservation Service)

The soils of the Southern group are basically derived from volcanics and therefore more fertile and suitable for a wide range of agricultural production. Aitutaki and Rarotonga provide the larger areas of arable soil.

On Rarotonga, swamps are located at the toe of the foothills and behind the coastal ridge. On the *makatea* islands, the swamps extend from the inner foot of the *makatea*. These swamps are generally planted with taro *(Colocasia esculenta)*.

Sediment from the deeply weathered clay soils of the interiors of Atiu, Mitiaro and Mauke enriches the fertile arable lowlands and taro producing swamplands. On Mangaia and Atiu, some areas of steeper uplands formerly used for pineapple production are actively eroding as a result of poor cultivation and drainage practices; nearby areas of uncultivated fernland are

also actively eroding, with the cause attributed to frequent firing. The sediment from these areas is both blocking natural drainage outlets through the *makatea*, causing flooding of some taro areas, and silting upper reaches of the taro swamps, reducing productivity.

While the degree of sheet, rill, and gully erosion in affected areas of Mangaia and Atiu is quite spectacular, a large proportion of the islands are unaffected. For example, while some 10.6 per cent (301 ha) of Atiu has lost a great part of its topsoil (Jessen et al., 1990), some 89 per cent of Atiu is largely unaffected by soil erosion, with the productive volcanic terrace soils of the central lowlands showing no evidence of erosion under the present land use regime. The extent of soil loss, however, points to the need for greater application of soil conservation principles and practices.

Taro is a staple food of the Cook Islands, and taro swampland systems like this one on Rarotonga need constant nurture.(photo courtesy of Cook Islands Conservation Service)

On Rarotonga, although there are significant areas of eroded soil, especially in the upland slopes, there is generally a fast rate of re-growth which protects the soil from extensive surface wash and loss of nutrients.

2.3.3 Water

The Northern Group, being coral atolls, are without surface water and dependent for supplies on the fragile fresh water lens which is subject to rapid depletion, salt water intrusion, and other pollution. Individual homes traditionally depend on rainwater stored in small containers. However, with the introduction of larger tanks, most dwellings now have 4,500 L (1,000 gall) capacity ferro-cement rainwater tanks, while 45,000 L (10,000 gall) communal rainwater tanks are being constructed near or under large public buildings.

The volcanic islands of the Southern Group are well supplied with good quality drinking water and have no major problems during normal climatic conditions. On Rarotonga and Mangaia, the springs and streams within the catchment valleys provide a good source of potable water and these have already been tapped using filter bed intake systems. On Rarotonga, water is piped from the stream catchments into the main reticulation system, serving the majority of households.

On other volcanic islands of the Southern Group, adequate underground aquifers and pumping facilities have been provided under CIG water development programmes. The undulating terrain of these islands makes gravity-fed reticulation possible, with pumping systems used to supply settlements in flat or elevated areas.

2.3.4 Energy

Electricity is supplied to most inhabited islands. The electric generators are all diesel-powered, the fuel being imported at great cost to foreign exchange. Photovoltaic systems have been introduced to Mitiaro, Pukapuka and Palmerston and the CIG seeks to promote the wider use of solar energy to reduce dependence on imported fuels. The experience of householders with photovoltaics has been mixed, with dissatisfaction with the cost of system maintenance. A more notable success has been achieved through the introduction of locally produced, domestic, solar hot water systems.

Firewood and coconut husk/shell remain the major source of energy for cooking, extensively so on the Outer Islands and to a lesser extent on Rarotonga. Firewood supplies do not constitute a major problem. An attempt to introduce steam-fired generators proved unsuccessful due to the use of inappropriate

equipment and the labour constraints associated with the continuous supply of firewood in sufficient volumes to feed the boilers.

Investigations of wave and water energy will soon be expanded with the planned assessment of a small-scale wave energy system and small hydro-power system.

2.3.5 *Minerals*

The Cook Islands are not rich in land-based minerals but have a potential source of wealth in deep-sea nodules rich in cobalt, with huge quantities of manganese nodules on the seabed of the islands north of Rarotonga.

On land the term "mineral" is used to describe crushed basalt used for construction and the mining of beach and inland sand deposits. Extensive mining of beach sand has occurred for the past fifty years and is widely believed to be a major contributor to coastal retreat on Rarotonga.

Fernland species are believed to be fire-dependent. (photo courtesy of Cook Islands Conservation Service)

2.4 Biological features

The islands of the Cook Islands are remotely located on a biological diversity gradient which diminishes with distance from the continental land masses, and also with the distance north and south of the equator. Within the country, the principal influence on biological diversity is the physical structure of the islands, with some shaping from episodic events such as cyclones and storm surge.

The other main influence on the biological resources of the Cook Islands has been the changing pattern of land use since the arrival of missionaries.

2.4.1 *Flora*

With 173 flowering plants recorded of which 18 are endemic, the Cook Island's endemism rate is about 10 per cent. Vegetation communities found in the Cook Islands are described in the SOE as atoll communities; *makatea*, coastal ridge, wetlands, fernlands, and the interior forest of Rarotonga.

The typical atoll community vegetation includes species of *ngahu (Scaveola taccada)*, *ngangie (Pemphis acidula)*, *pohutukava (Sophora tomentosa)*, Suriana, *(Suriana maritima)*, the common coconut or *'akari (Cocos nucifera)* and pandanus or *'ara ta'atai (Pandanus tectorius)*, the much used Guettarda or *'ano (Guettarda speciosa)*, *tamanu (Calophyllum inophyllum)* and *puka tea (Pisonia grandis)*.

The salt tolerant coastal vegetation of the *makatea* communities are typically dominated by *ngangie* and *ngahu*, followed in abundance by pandanus or *toa (Casuarina equisetifolia)*, *utu (Barringtonia asiatica)*, *'akari*, *puka (Hernandia peltata)*, and *maire (Alyxia elliptica)*. The inland *makatea* vegetation includes *karaka (Elaeocarpus florindanus)*, *tuitui (Aleurites moluccana)*, *turina (Hernandia moerenhoutiana)* on Mangaia and, on Mitiaro, some remnant sandalwood or *a'i (Santalum insulare)*.

The coastal ridge communities are more adapted to free draining, alkaline, coral sand substrata. This

community has been extensively altered, particularly on Rarotonga, with the *motu* of Aitutaki and the Muri Lagoon on Rarotonga being two areas where some remnants of this vegetation community persist.

The species on the beach are mainly ipomea *(Ipomea pescarprae), triumfetta (Triumfetta procumbens)* and vigna *(Vigna marina)*, with some grasses and herbs. This is followed in abundance by *ngahu, tauhinu (Messerschmidia argentea), ngangie*, Suriana, the legumes, and *nito (Leucaena insularum* and *L. utukava)*. Other species include *nono (Morinda citrifolia), orongi (Pipturus argenteus)*, the dominant *'au (Hibiscus tiliaceus), 'akari, utu, pukatea, 'ara* (on Aitutaki), *'ano* and *toa*.

In addition to the indigenous species, a wide range of weeds, herbs and grasses have been introduced including mimosa or *tita pikika'a (Mimosa pudica)* and the more prominent *tataramoa (Lantana camara)*.

The wetland communities include species associated with swamps and marshlands. The latter are those associated with lake environments as found on Mitiaro, the salt marshes of Ngatangiia on Rarotonga, and selected areas around Aitutaki and the Northern Group. Much of the swampland is dominated by grasses. Waterlilies are common with typhus or raupo. Sedges are the dominant species of the Mitiaro wetlands; they are fire-induced. The salt marshes of Aitutaki and of Ngatangiia on Rarotonga are important for fish breeding, with a wide acceptance that these marshes are hatcheries for locally important fish species.

The fernland communities are among the most important on the islands of the Southern Group, particularly on Mangaia, Atiu and Rarotonga. It is believed fernlands were the result of repeated burning of the original vegetation. They are important environmentally, providing physical protection of the poor soil from raindrop hammer, retarding surface runoff and enhancing infiltration rates. Guava *(Psidium guajava)* is commonly found around the lower borders of fernlands.

The homalium or *mato (Homalium acuminatum)* and cloud forests of inland Rarotonga are most important

'Ua motukutuku (Melastoma denticulatum), *a common species of the slope forest.(photo courtesy of Cook Islands Conservation Service)*

because of a wide variety of endemic species that are found there. While the inland forest supports about 105 native species (10 of these are Polynesian endemics and 15 are unique to Rarotonga), the cloud forest, which is found above 400 metres elevation, covers less than 3 per cent of the total area of Rarotonga and

Rarotonga Freycinetia or Kiekie (Freycinetia wilderi), *a common species of the slope forest. (photo courtesy of Gerald McCormack)*

supports species of flowering plants not found in other communities on Rarotonga. Four of these cloud forest species are not found anywhere else in the world. These include two spectacular species, the *Te Manga Cytandra (Cytandra lillianae)* and the Rarotonga Sclerotheca *(Sclerotheca viridiflora)*. Twelve ferns are restricted to the cloud forest and two are endemic to Rarotonga.

The slope forest is dominated by *mato*; other common species include *'au* which is widespread especially in disturbed areas; polynesian chestnut or *i'i (Inocarpus fagifer)*; kingfern or *'anaepu pu a (Angiopteris longifolia)*; *pu pu'a (Fagraea berteriana)* found mainly along the ridges; Rarotonga fitchia or *te neinie (Fitchia speciosa)* with its large bright orange flower; *kavakava (Pittosporum arborescens)*; *kaiatea (Weinmannia samoensis)*; *'ua motukutuku (Melastoma denticulatum)*; Rarotonga Freycinetia or *kiekie (Freycinetia wilderi)*; and *rata (Metrosideros collina)* with its spiky bright red flowers.

There are a large number of introduced species on the Cook Islands, mainly food or ornamental plants. Some of these have been beneficial while others have proven to be invaders or become serious pests.

There is also a large number of plants introduced as soil fertility improvers, including mimosa *(Desmodium spp)*, kudzu *(Pueraria lobata)*, Brazilian lucerne or stylo *(Stylosanthes guianensis)*. These leguminous plants have become widespread, particularly in the Southern Group and are common along roadsides. Some species like the mimosa have become bad weeds and other introduced weeds are a potential threat to the indigenous forest systems particularly on Rarotonga. The balloon vine *(Cardiospermum halicacabum)*; balsam pear *(Momordica charantia)* and red passion-fruit *(Passiflora rubra)* are three such weeds and they nearly always occur together. The balloon vine is found only on Rarotonga. The mile-a-minute *(Mikania micrantha)* is another commonly recognised weed which is a problem for growers.

Introduced tree species which have proven to be invaders include *rau-maniota (Cecropia palmata)*, the African tulip or *patiti-vai (Spathodea campanulata)* which is mainly found in the interior of Rarotonga, and the Java plum or *ka'ika (Syzygium cumini)* which is now widespread throughout the Southern Group.

Grasses also represent an important group of introductions. There are an estimated 60 species, of which 12 are pre-European (native and aboriginal) introduced species. Other introduced species include the thorny lantana or *tataramoa*, the night blooming cestrum or *tiare Ariki Vaine (Cestrum nocturnum)*, the black-berried shrub, ardisia, and the strawberry guava or *tuava papa'a (Psidium cattleianum)*.

2.4.2 *Wildlife*

Mammals

Terrestrial mammals are restricted to introduced species such as pigs, dogs and cats. The most easterly known occurrence of the Tongan flying fox (a fruit bat) or *moa kirikiri (Pteropus tonganus)* is in the Cook Islands; it is found only on Rarotonga and Mangaia. Three species of rats are also found and pose a threat to the survival of the endemic Rarotonga flycatcher.

The coconut crab is a gastronomic delight but is common now only on some outer islands with small populations. (photo courtesy of Cook Islands Conservation Service)

Crabs

The Cook Islands also have a number of crabs including the butcher land crab or *tupa (Cardisoma carniflex)*, and the coconut crab or *unga kaveu (Birgus latro)*; the *tupa* is a local food source and has been heavily exploited, while the coconut crab, which is a gastronomic delicacy, has become extremely scarce on islands with larger populations. Another heavily exploited and threatened species is the banded prawn killer or *varo (Lysiosquilla maculata)*.

Birds

There are a total of eleven seabird species found in the Cook Islands nesting mainly on atolls and sandcays; most are very sensitive to human interference and thus the uninhabited islands of Takutea and Suwarrow are the most important seabird breeding sites in the Cook Islands.

The masked booby (Sula dacrylatra) *is found in limited numbers on Suwarrow. (photo courtesy of Cook Islands Conservation Service)*

Takutea supports four seabird species which do not breed elsewhere in the Southern Group: the white-capped noddy *(Anous tenuirostris)*, the red-footed booby *(Sula sula)*, the great frigatebird *(Fregata minor)* and the brown booby *(Sula leucogaster)*. Takutea also supports the largest colony of red-tailed tropic bird or *tavake (Phaethon rubricauda)* in the Cook Islands.

Suwarrow contains the only large colonies of sooty tern *(Sterna fuscata)*, brown booby and least frigate

The rare Rarotonga flycatcher or kakerori (Pomare dimidata), *currently the subject of a species recovery programme. (courtesy of Cook Islands Conservation Service)*

bird *(Fregata ariel)* within the Cook Islands, and the second largest colony of red-tailed tropic bird. The masked booby *(Sula dacrylatra)* is also found nesting in limited numbers.

On land, there are four native birds found in small numbers in the inland mountains and bluffs of Rarotonga: the Rarotonga starling or *i'oi (Aplonis cinerascens)*, the Cook Islands fruit-dove or *kukupa (Ptilinopis rarotongensis)*, the Pacific pigeon or *rupe (Dacula pacifica)* and the more rare Rarotonga flycatcher or *kakerori (Pomare dimidata)*. Other native land birds are the Mangaian kingfisher or *tangaeo (Halcyon ruticollaris)*; the Cook Islands warbler or *kerearako (Acrocephalus (caffer) kerearako)* found on Mangaia, Mauke, Mitiaro and Atiu; and the Atiu swiftlet or *kopeka (Aerodramus (leucophaeus) sawtelli)* found only on Atiu.

The introduced Indian mynar or *manu* is now the dominant land bird on almost all the islands. Migratory land birds found in the Cook Islands include the golden plover or *torea*, the long-tailed cuckoo or *karavia*, and the wandering tatler or *kuriri*.

The highly endangered *kakerori* has been the subject of a species recovery programme for a number of years. Other species at risk are the *tangaeo*, *kopeka*, and the *i'oi*.

2.4.3 *Marine life*

Reefs

Twenty-four coral genera and 58 species have been identified in the Cook Islands, mainly on Aitutaki and Rarotonga. Four genera reach their latitudinal limit in the Cook Islands and do not occur further south.

Coral reef resources and lagoons provide a very important food source for Cook Islanders particularly in the Northern Group and also on islands of the Southern Group. The high dependence on imported foods and the change of life-style in the Southern Group, not to mention the degraded reef and lagoon environment particularly on Rarotonga, has meant that the harvest of reef food is declining.

Paua *(Tridacna maxima)* is the most popular shellfish harvested, with the introduced trochus *(Trochus niloticus)* becoming increasingly popular as a food on Aitutaki as well as playing an important part in local earnings of Aitutakians in recent years. Trochus has also been established in Palmerston and introduced to Manuae and Suwarrow. Other harvested species include rough turban snail or *'ariri (Turbo sectosus)* found on the reef, and the Pacific asphismay or *ka'i (Asphis violescens)* found in rubble sand beds, various species of sea-urchins and sea-cucumbers, and sea-grapes or *rimu (Caulerpa racemosa)*.

Illustrated chart of marine life. (artwork by Judith Künzle)

In the Northern Group, particularly Manihiki and Penryhn, the blacklip pearl oyster or *parau (Pinctada margaritifera)* is harvested as a food and for black pearls.

Inshore

There are no available data on the number and abundance of fish species in the lagoons and on the reefs of the Cook Islands. Common species include reef sharks, snappers, gropers, parrot fish, jacks, mullet, big eye, and surgeon fish.

Offshore

Two main turtle species are found in the Cook Islands, the hawksbill turtle or *fonu kokorove (Eretmochelys imbricata)* found in Manihiki and Pukapuka and the green turtle or *fonu pokaikai (Chelonia mydas)* found mainly in the Northern Group.

2.5 Cultural & historical heritage

Cook Islands people are acutely aware of their cultural heritage, and traditional customs and practices pervade their daily life-style. Even though society has been much influenced and altered by external religious beliefs, life-styles and the cash economy, their adoption of aspects of Western culture is nevertheless leavened by the yeast of traditional culture.

From the environmental viewpoint, there are both good and bad traditional practices. Good practices include the *ra'ui*, a traditional conservation practice which is a form of resource management but now being practised fully only in some of the Outer Islands. In general, traditional culture dictates that anything done by a person or a clan must be in harmony with nature.

While a number of cultural changes have taken place and will continue to do so, the oral traditions of the people, many of the customs surrounding the main phases of life—birth, marriage and death—and the social institutions of the *marae* (meeting place), *koutu* (investiture sites) and *paepae* (house sites) still persist,

Weaving coconut fronds for roof thatching. (photo courtesy of Cook Islands Conservation Service)

although some more strongly than others. Another widely used and important custom is the traditional calendar which is used for making decisions on family planning, fishing for certain species, agricultural practice, location of structures and other matters. Also retaining its importance is the practice of traditional Maori medicine, although this is more as an adjunct to European medicine rather than as an alternative.

There is a strong sentiment within the Cook Islands to strengthen the traditional acculturation of the younger generation to reduce the risk of any further decline in the traditional culture. A central element will be the focus on Cook Islands Maori as the national language; this is particularly important because of the close linkage between language, material culture and environmental appreciation.

2.6 The people

2.6.1 *Demography*

The population of the Cook Islands is currently estimated at 18,500 with about 13 per cent living in the Northern Group and 87 per cent in the Southern Group (56 per cent of whom are living on Rarotonga). The people are Maori and share with the indigenous people of French Polynesia and New Zealand a bond of history and culture. Cook Islanders are also citizens of New Zealand. The population of Cook Islanders in New Zealand is said to exceed 20,000, which is larger than the home population. Most Cook Islanders when migrating abroad, travel to either New Zealand or Australia.

From 1902 the population grew steadily to reach a peak of 21,323 in 1971. Since 1976 there has been a decline in numbers through emigration, with an estimated population in 1986 of 17,614. However, the 1991 census shows an increase over the 1986 census of 5.55 per cent, bringing the population back to 18,432.

Internal migration is an important feature of the demography of the Cook islands, with the 1991 census figures showing, for example, a population increase of Manihiki of more than 30 per cent while the population of Mangaia and Palmerston declined by more than 20 per cent.

The age distribution is also affected by internal migration and emigration with an ageing population on some of the Outer Islands and of the country as a whole. As might be expected through the emigration of able-bodied young men and families, there is a noticeable decline in the 0–14 age group in the Cook Islands and an increase in numbers of people over 60 years of age. The 1986 census also shows a higher proportion of males (52.2 per cent) than females (47.9 per cent).

The age distribution of people in 1991 was:

Age Groups	Percentage of population
0–14	34
15–46	46
45–59	12
> 60	8

2.6.2 *Education*

Most schools in the Cook Islands are government-operated. Only four out of twenty primary schools and one of eight secondary schools are privately owned.

The CIG aims to upgrade the Cook Islands education system and the recommendations of a major review made in 1989 are now being implemented. One environmentally important development arises from a policy for each school to establish its own committee to govern the school affairs, with the intention that this approach will secure greater community support. On these committees will rest a great responsibility for developing in students and in their parents an increased environmental awareness.

From an environmental point of view, CIG policy is teach environmental control and conservation as a subject in school curricula at the school certificate level. However, there remains a need to broaden the educational base through science training in the social and biological environment.

2.6.3 *Religion*

The Cook Islands people have always had a strong religious fervour. Since the arrival of the Christian missionaries, this fervour has been directed to various denominations of the Christian faith and the churches are the nuclei for community work programmes and activities.

From an environmental viewpoint, the church is a very important medium of communication by which environmental messages may be disseminated throughout the various denominations and hence the community.

2.6.4 *Labour & employment*

Some significant changes have occurred in the structure of employment in the past fifteen years. Particularly significant has been the decline in employment in the primary sector since 1981, and the correspondingly sharp increase in employment in the services sector. The fall in the primary sector appears to have been particularly significant on Rarotonga.

Traditionally, the Cook Islander has followed a subsistence way of living. However, the agricultural labour force has declined since 1971, but with the fall largely offset by major growth in tourism and related services.

Unemployment is not considered a major social issue in the Cook Islands, but with an unemployment level of 5.6 per cent in 1986 and reduced employment opportunities in the depressed economic circumstances of New Zealand and Australia, migration of the young-adult age group could be reduced and thereby cause an increase of unemployment in the Cook Islands.

2.7 Economic development

The economy of the Cook Islands is characterised by the high cost of imports and the proportionately low value of exports. Primary production once dominated the economy but there has been a decline in this traditional sector and a surge in service-related industry to cater for the greatly increasing numbers of tourists.

Agricultural production retains importance for the local economy while there are prospects for increasing the productivity of offshore fisheries. In recent years, the cultivated pearl industry of the Northern Group has become a significant contributor to the economy.

2.7.1 *Government development policies & GDP*

The CIG development policies lay emphasis on infrastructure improvements which will provide the base for sound economic development.

The first national development plan for the Cook Islands had as its main objective the financing by the public sector of the infrastructure requirements which would support and foster a private sector economy. Port and wharf facilities, airstrips and roads were constructed, and water supply, energy, medical and

communication services established or upgraded. At the same time, new technology has been transferred to the country and the level of internal and external financial services greatly developed. As a consequence, the economy has experienced several years of sound private-sector led growth.

GDP grew at an average rate of 6 per cent over the period 1983–1990 after allowance for inflation, but with sharp surges upward or downward of between 7 and 11 per cent, indicating a high volatility in the GDP growth rate.

Sector GDP shows a sharp decline in agriculture and fishing from 25.5 per cent of GDP in 1982 to less than 18 per cent in 1990. Over the same period, the finance and business services sector has increased from 2.4 per cent in 1982 to 12 per cent in 1990, attributable partly to the operation of the offshore financial centre.

Wholesale and retail trade and restaurants and hotels remained relatively steady over the 1982–1990 period. The service sector, including government services, made up almost 77 per cent of GDP in 1990, compared to 65 per cent in 1982.

Table 2.3 **Value of agricultural exports, $'000 FOB**

Commodity	Year					
	1985	**1986**	**1987**	**1988**	**1989**	**1990**
Agricultural produce	2238	1771	1675	2532	1891	1913
Pearlshell	348	641	1149	543	1110	565
Clothing/footwear	2437	5783	8228	2931	578	337
Handicrafts	62	55	8	35	2	-
Other exports	268	685	889	661	1130	5350
Total	**5353**	**8935**	**11949**	**6702**	**4711**	**8165**

Note: Above figures are rounded

Source: Cook Islands Government, 1992, Tables 2.6/7

2.7.2 *Household expenditure & income*

A family income census for Rarotonga undertaken by MOPED in 1987 indicated that 41 per cent of the 3,600 families surveyed had an annual income below $10,000 and only 1.4 per cent had incomes exceeding $20,000.

Remittances from Cook Islanders living overseas have for many years made a significant contribution to the economy, raising household expenditure and living standards beyond the level which could otherwise be sustained. For some years the remittance passing through the Post Office Bank in the form of money orders totalled around $2 million annually, with a peak of $2.64 million in 1987, the year of Cyclone Sally. In 1990 there was a marked slump to about $1.44 million, possibly as a result of the economic recession in New Zealand. In addition to the money order transfers, it has been estimated that further remittances of $1 million enter the Cook Islands annually through two commercial banks.

2.7.3 *International trade*

Total imports for 1990 were valued at $83.6 million with exports estimated at $8.2 million. The main import items in that year were food (20.6 per cent), fuel (11.7 per cent), manufactured goods (33.5 per cent), and machinery/vehicles (18.0 per cent). New Zealand has continued to supply between 50 and 60 per cent of imports since 1978. Imports from other nations, particularly those in Asia and to a lesser extent the United States and Fiji, are now increasing.

Exports have been heavily dependent on agricultural commodities and hence subject to the severe fluctuations in international market prices. Export values have varied widely over the period 1986–1990 from a peak of $11.9 million in 1987 to a period low of $4.7 million in 1989. The 1990 value was $8.2 million.

The export pattern has been changing over the five-year period, with the most marked change in the manufactured goods sector. The export of basic manufactures has increased 100-fold to almost $4.4 million, accompanied by a tenfold decrease in the export of miscellaneous manufactured goods, including clothing, footwear and handicrafts.

2.7.4 *Inflation*

Inflation in the Cook Islands is closely linked with inflationary pressures in New Zealand because of the

Table 2.4 **Total government expenditure compared with expenditure on the Cook Islands Conservation Service's activity for the period 1988–1990**

Expenditure	Total CIG ($ million)			CICS ($'000)		
	1988	1989	1990	1988	1989	1990
Revenue	56.9	55.1	60.3	–	–	–
Total expenditure	55.9	57.1	60.1	36.5	99.8	136.0
Recurrent expenditure	45.0	47.4	48.8	33.3	91.2	113.7
Recurrent per cent	80.5	83.0	81.2	92.2	91.4	83.6
CICS as per cent of total spending	.065	.175	.226			

use of New Zealand currency and because up to 60 per cent of imports are sourced from that country. The inflation rate in the Cook Islands is measured by the Rarotonga Retail Price Index (RRPI) (Rarotonga being the major port of entry). Inflation for the period 1987–1991 has averaged 5.7 per cent per year; this compares with 11 per cent for the period 1984–1987 and 15 per cent for the preceding 10-year period.

2.7.5 *Government finance*

Total Government revenue grew over the period 1986–1990 from $41.8 million to $59.6 million. Taxes provide 41 per cent, of which income tax is the largest contributor, followed by sales tax; other taxes applying are a turnover tax and a separate company tax. Customs duties provide 10 per cent. The revenue increase is on top of a 7 per cent decline in budgetary support from New Zealand over the period.

Total expenditure in the 1990 financial year was $60.1 million, almost half of which was allocated to personnel services, including wages and salaries, contractual services, and other benefits.

Total government expenditure for the three years 1988–1990 is given in Table 2.4, and there compared with its direct expenditure on the Cook Islands Conservation Service (CICS). Conservation expenditure is seen to be a very small percentage—less than a quarter of one per cent. Nevertheless, the increasing importance of conservation to the Government is reflected in the increased allocation of funds to the CICS over the three-year period.

2.7.6 *External debt*

At June 1991, the CIG had six external loans to a total value of $24.6 million. Three loans were with the Asian Development Bank (ADB); one with a private bank (for road improvements and consultancies); one with the New Zealand Government (for equity in a major tourist hotel venture); and one from the French Government for infrastructure development in the water supply and energy sectors.

The construction of an international 4-star hotel, the Sheraton Cook Islands, is under construction at an estimated cost of $71 million. It is scheduled for completion in late 1993. While the repayment of loans for this venture is the responsibility of a Crown corporation, the CIG stands as loan guarantor.

2.7.7 *Sector growth patterns*

Agriculture

Due to the limited land area and the remoteness of the Cook Islands, agriculture faces disadvantages, in comparison to other developing countries of the region, especially in terms of transportation, marketing and economies of scale.

The agricultural sector is characterised by a traditional land system which can restrict full land utilisation; a high level of part-time activity in agricultural production; limited and expensive inter-island and international shipping and air transport services; limited labour supply; restricted availability of long-term credit; and a high level of government subsidy for agriculture.

In the past, the main export cash crops have been copra; bananas on Aitutaki; pineapples on Mangaia and Atiu; vegetables and root crops from Mauke and Rarotonga; and citrus, pawpaw and other fruits from Rarotonga.

Copra, which once was the largest component of agriculture production, ceased production in the Northern Group in 1987 due mainly to the depressed world market price. While copra production ceased, commercial production of coconut picked up with the establishment of the Coconut Cream Factory in early 1987.

Banana exports from Aitutaki ceased due mainly to inconsistent quality, irregular shipping, and inability to compete with imports to New Zealand from other

countries. An attempt to revive this industry is being made. The pineapple industry is now defunct. Citrus production continues on Rarotonga for the local market from an estimated area of 353 acres (1988), but exports to New Zealand of both fresh fruit and juice could not compete with South American produce and export therefore has now ceased.

In all, agricultural production in 1989 was reported to be down by almost 20 per cent from 1981 and further falls are expected. Although pawpaw production peaked in 1988 at 1000 tonnes and fell to 600 tonnes in 1990, interest in production remains high and the total return to farmers in 1990 was estimated at $1.52 million. The recent acquisition of a cool store provides an avenue for improving the quality and transport conditions for pawpaws and other perishable produce. Beans, eggplants and chilli production remains high with a favourable net estimated return to farmers on chilli in 1990 of about $11.50 per kg.

Export of cash crops has declined markedly, but the indications are that there has been a significant rise in the value of fruit and vegetables sold on the local market. While it is extremely difficult to gather statistics on the domestic market, production of cash crops for the domestic market was estimated by the Ministry of Agriculture to be about $8 million in 1990.

On the Outer Islands, with the exception of the well organised vegetable production and marketing effort on Mauke, the Ministry of Agriculture is leading a move away from bulk perishable crops to those with long storage life, ease of transport, lack of quarantine restrictions and more assured markets—such crops as the arabica coffee and vanilla. Coffee has been successfully developed on Atiu, and both crops show particular promise for Mauke, Atiu and Mangaia, as well as Atiu.

Recognising the transport limitations in the Cook Islands and the changing market demand, the Ministry of Agriculture is actively promoting niche marketing strategies for high value, exotic fruits. This policy takes advantage of the climate and soil fertility of the Cook Islands and overcomes the major problem of freight costs being too high a proportion of expected market returns to ensure continued economic viability of production.

Fisheries

There has been only limited harvest of fish resources within the Cook Islands EEZ. There are a number of bilateral fishing agreements and the licences for foreign fishing vessels have made a useful contribution to foreign exchange earnings.

There are only 8–12 full-time commercial fishermen in the Cook Islands (Rarotonga and Aitutaki) with about 40 part-time commercial fishermen on both islands to supply the local market. There is frequently a shortage of fresh fish on Rarotonga, and the expansion of artisanal fishing activity must remain an area of priority if the expectations of the increasing numbers of tourists for fresh seafood are to be met.

Table 2.5
Cook Islands exports of cultured pearls

Year	Quantity (kg)	Value ($)
1985	1.0	9,640
1989	26.0	595,780
1990	84.0	4,366,632

Source: Cook Islands Statistics Office

Pearl Industry

A profitable and rapidly expanding pearl industry has developed in the rural Northern Group islands. The exploitation of the pearl oyster shell had been a major activity of the Northern Group in the late 19th and early 20th centuries, but declined during the late 1960s due to declining oyster stocks.

The current focus is on pearl oyster cultivation for both cultured pearls and pearl shell, particularly on Manihiki, but with Penrhyn and Suwarrow also under investigation. Earnings over the past six years from pearl shell alone has made a significant contribution to the economy of Manihiki. The value of the pearl shell has more than doubled over the 1985–1990 period to $13 per kilogram and a total value in 1990 of $565,946.

The production of cultured pearl has also proven highly successful over the 1985–1990 period with the 1990 auction fetching $4.3 million. The exceptional growth is evident from Table 2.5.

On Manihiki, there are currently 240 licensed farms and approximately 100 of these are active. Some of the licensed farmers operate as family units under more than one licence. The average farm size is approximately one hectare, but currently farmers may operate larger farms depending on farmer capability and management.

Trochus and Clams

Other commercial lagoon fisheries include trochus and giant clams in Aitutaki lagoons. Trochus was first introduced on Aitutaki in 1957 and commercial harvesting commenced in 1980. Recent introductions of the giant clam are aimed at improving the economy of Aitutaki and replenishing the natural stock. The Trochus Act of 1985 provides for the management of this resource.

Tourism

The tourism industry has increased at an enormous rate in the Cook Islands and is now the nation's greatest income earner. Since 1972, annual visitors to Rarotonga have increased fivefold from 10,000 to 50,000 in 1992. Currently, visitors remain for an average of 10 days each and spend approximately $100 per day per person. The tourism industry is therefore currently estimated to be worth approximately $50 million annually to the economy (Tourism Master Plan, 1991).

The natural resources and human resources of the Cook Islands are the basic assets upon which tourism depends for its very existence. It is therefore in the direct economic interests of the tourism sector to lobby as forcefully as possible for conservation and sustainable development of the natural environment. The importance of tourism to the future economy will continue to grow providing the special attraction of the Cook Islands which draws the tourists in the first place is not destroyed. Such appeal derives from a blend of people, scenery, and nature tourism opportunity.

part II

Environmental strategies & programmes

With the publication of the World Conservation Strategy in 1980 came the clear message that conservation must not be regarded as being opposed to development; without due regard to conservation, development cannot be sustained. With the growing recognition of this fact, the phrase "sustainable development" has now become common usage.

But "sustainable development" seems capable of being interpreted in a wide variety of ways. The Second World Conservation Strategy Project (*Caring for the Earth: A Strategy for Sustainable Living*, IUCN/UNEP/WWF, 1991) defined sustainable development as: "The use of an organism, ecosystem or other renewable resource at a rate within its capacity for renewal". Or, expressing the same concept in a more general way, "Improving the quality of human life while living within the carrying capacity of supporting ecosystems".

For the Cook Islands, NEMS Seminar participants defined "sustainable development" as:

> *Te au angaanga ta tatou ka rave i teia tuatau kia kore e riro tei reira ei ta kinokino atu i te oraanga o te au uki ki mua.*

This was translated into the English language as:

> Development that meets the needs of the present without compromising the ability of future generations to meet their own social and economic needs.

Sustainable development is fundamentally about the survival of our species. In that sense, the subsistence village life is sustainable development, something at which the people of the Cook Islands have been expert for a long time. The idea of sustainable development, therefore, is nothing new to the Cook Islands. But, beyond mere survival, Cook Islanders want a satisfactory life for themselves and their descendants, with improved standards of living. A new type of economic development is required for that goal to be achieved, and new ways must be learned for resource use and management to ensure the economic gains made are sustained.

The strategies and programmes which are presented in Part II are directed towards the target of sustainable development.

GOAL 1

Integrate environmental considerations in economic development

It is clear that the key to the sustainable use of resources and the achievement of environmental conservation is through the integration of environmental safeguards and economic decision making. This is a complex task. To achieve long-term economic and environmental viability, some institutional and legal changes need to be made in order to ensure that policies can be carried out within a consistent and enforceable legal framework, both on the Outer Islands and on Rarotonga. These include the introduction of integrated mechanisms for the generation of economic and environmental policy; the enactment of effective, comprehensive, umbrella legislation (including minimum environmental standards); and the revision of Island Council by-laws.

The Cook Islands has become a party to the "Rio Conventions", namely the Global Convention on Climate Change and the Biodiversity Convention. It also has a number of commitments under Agenda 21. Consequently, it is now important for the Cook Islands to consider the implications of the conventions and review national laws accordingly.

Strategy 1.1

Review & revise the legal framework

The need to revise the Conservation Act 1986–87 had been recognised for some years. There have been a number of reviews of the Act and its various deficiencies identified. The Act is deficient in its treatment of sustainable development, in the need for active involvement of landowners and Island Councils, and in the definition of aspects of the marine environment.

A draft Bill for an Act, entitled the Environment Act 1992, was prepared to "establish an Agency for the Environment and to provide for the conservation, development and management of the environment in a sound and sustainable manner". The Agency would comprise a revamped Environment Council and a strengthened Environment Service (CICS).

This Bill has attracted much public debate, in particular on the issues of land ownership and the powers invested in the Director of the proposed Environment Service. The Seminar discussions focused mainly on issues of specific provisions for different islands, definitions of the foreshore and the powers of the Director. There was little debate at that time on the concept of the establishment of the Agency for the Environment.

The Conservation Act had been considered deficient, with a need to incorporate:

1) an EIA process;
2) a sustainable development aspect, enjoying community support and participation through public involvement in the preparation of management plans and the EIA process;
3) clear, adequate or acceptable definitions of the foreshore zone, the marine environment and the management of resources therein;
4) a broadened Council with input from non-governmental organisations; and
5) an extended application of the Act beyond Rarotonga and Aitutaki to the whole nation.

Other deficiencies identified at the Seminar include:

1) inadequate coverage of forestry;
2) lack of control of mining and quarrying activities;
3) lack of control for removal of vegetation on steep slopes;
4) lack of control on the use of earth-moving machinery;
5) a need to incorporate traditional conservation principles and practices in the legal system;
6) a need to provide for regulation of the construction of signs to reduce visual pollution; and
7) a need to provide for regulation of trimming of trees.

From the Island Council perspective, it was also considered that the Bill must address the needs of Island Councils which would determine their own conservation requirements and pass their own by-laws. In the case of Rarotonga where there is no Island Council, there is some merit in establishing a local government empowered to draw up its own conservation by-laws.

Each island needs to have its own by-laws, but these need to be mirrors of, or in total harmony with, national laws. The national laws must serve as umbrellas under which island by-laws can shelter, but Island Councils should always have the right to set more stringent pollution standards or other environmental measures.

Programmes

1.1.1 *Revision of the current Conservation Act*	The revision of the Conservation Act 1986–87 is a prerequisite to the development of most of the programmes under the NEMS, and essential for the implementation of sustainable development principles.
****1.1.2*** *Review of Island Council by-laws* see Appendix 1, page 76	The review of Island Council by-laws which have an environmental and conservation objective is a particularly important task, and fundamental to the proper implementation of sustainable development practices on the Outer Islands. It is only through such a review process that consistency can be achieved between national law and the policies and by-laws

of Island Councils. Through the review, appropriate environmental control standards for achieving sustainable development can be introduced to Island Councils. This programme would fund such a review process and provide training for Councillors of the Outer Islands to strengthen their effective implementation of their by-laws.

Strategy 1.2

Strengthen national environmental management

The protection and management of the environment is very much an interdisciplinary endeavour. The CICS may be charged with the prime responsibility but that does not absolve other ministries responsible for activities which may impact on the social, built or natural environment from their own environmental responsibilities. How many of these ministries have appointed people with an environmental planning and protection brief to ensure department policies and development proposals are carefully appraised from the viewpoint of potential environmental impacts?

There are quite severe constraints in the overall institutional capability of government for environmental administration at this time. The CIG is well aware of these and has already taken a number of initiatives. Others will flow from the new legislative moves previously mentioned, and from the Cook Islands National Resources and Development Strategy 1992–1994, now in draft form.

The One Stop Shop

Various proposals have been made which have major environmental administrative implications, such as those for a Sustainable Development Commission (Tourist Master Plan), Development Co-ordinating Committee, Task Force on Environment and Development, Agency for the Environment, and others. While some of these administrative elements may serve useful purposes in themselves, there is a need for a body or agency where all of these aspects are drawn together, particularly for interacting with parties submitting development proposals.

Such considerations led a Seminar workshop to the conclusion that a "One Stop Shop" was needed to streamline social and economic development, and to take the lead role in co-ordinating, appraising and advising on all development proposals, both public and private sector.

A foreign investor makes a One Stop Shop his/her first and only place of call, apart from the banks and lawyers. There, all queries are quickly fielded to the appropriate line ministry for "instant" response; relevant information is provided, be it quarantine, areas of government assistance, subsidies etc.; and sets of environmental guidelines and standards are given, toget'.er with an environmental questionnaire to be submitted with the development proposal.

This questionnaire is subsequently vetted against a set of criteria which indicate the technical need or otherwise for the conduct of an EIA and preparation of an Environmental Impact Statement. If an EIA is to be undertaken, the CICS is required by the One Stop Shop to set the terms of reference for the study, which is then conducted and paid for by the proponent for the development.

The CICS then either evaluates the EIS or calls in an independent reviewer. Since the developer is responsible for that cost also, it is obvious that such requirements would be undertaken only by genuine investors. Such requirements would also apply in their full form only to major development activities. The CICS reports back to the One Stop Shop.

Consultative arrangements

The Seminar believed there was clear merit in reconstituting a form of Co-ordinating Committee for Permanent Secretaries, to assist co-ordination of inter-departmental activity on development issues and activities. Such co-ordination is particularly important with new proposals to ensure there are no major hitches and the development flows smoothly.

Regular meetings of a Co-ordinating Committee provide the opportunity for better integration of economic and environmental considerations to ensure development is sustainable.

Interdepartmental environmental consultation

The NEMS Seminar considered that a special and continuing effort should be made to raise the level of environmental awareness at all levels of government, but especially of Permanent Secretaries of Ministries and their deputies, and of government resource planning and management personnel. This need is discussed further in the next chapter within the context of other environmental education initiatives.

Another need is for the identification within each department of an officer responsible for environmental matters involving that department. The officer becomes the main liaison point with the CICS. This role is not one of critically examining the possible impacts of his/her own department on the environment; rather his/her concern would be for how the actions of other departments have environmental repercussions on those areas of prime responsibility to his/her own department.

Cook Islands Conservation Service Staffing

The CICS has a permanent staff establishment of nine, of whom eight are based on Rarotonga; the outposted officer is located on Aitutaki. Apart from an Australian AVA volunteer (environmental education), all staff are Cook Islanders.

However, there is an imbalance in the level of technical training among the CICS staff, with only two permanent officers having professional qualifications. The CICS has been most conscious of its lack of trained staff to discharge its responsibilities under the Conservation Act comprehensively and efficiently. Consequently, heavy emphasis has been placed on staff training and six trainee conservation officers have been engaged, two of whom are currently receiving tertiary education at the USP.

The Conservation Service currently (February 1993) has the following staff structure.

Position	Role	Location	Comments
Director	Head of the CICS	Rarotonga	
Senior CO	Environmental Planning	Rarotonga	
Senior CO	Foreshore Protection	Rarotonga	
Senior CO	Environmental Education	Rarotonga	AVA
Senior CO	Rarotonga	Wildlife	Contract
CO	Cultural Conservation	Rarotonga	
CO	OIC Aitutaki	Aitutaki	
CO	Counterpart	Rarotonga	Approved position
CO	Park Ranger	Rarotonga	Approved position
Information/ Secretary	Word processing/ Information support	Rarotonga	
AO	Clerical support	Rarotonga	Acting
Trainee CO	Wildlife	USP	
Trainee CO	Education	Rarotonga	
Trainee CO	Marine wildlife	USP	
Trainee CO	Terrestrial vegetation	Rarotonga	
Trainee CO	Undesignated	Rarotonga	
Trainee CO	Undesignated	Rarotonga	

Notes: CO: Conservation Officer; AO: Administration Officer.

The SOE refers (Section 5.3.1) to a number of desired staff positions for a Management Unit and a project Implementation Unit within the CICS. The Management Unit would include senior CICS planning, administration and support staff: it would also ultimately include five additional conservation officers to be outposted to the larger Outer Islands. They would complement the one Conservation Officer now posted on Aitutaki. The Implementation Unit would include the technical specialists in areas such as coastal zone management, environmental education, wildlife, information and extension, soil conservation, traditional practices and culture, waste control, and park managers.

The recruitment of staff for environmental planning, management and administration as set out in the SOE is fully supported by these NEMS. They would include

a Chief of Management, a Senior Planning Officer, an EIA Officer, the five Outer Island Operational Managers referred to above, a Senior Administration Officer, and a Computer Officer (who would provide computer support to staff and handle information input and output from resource databases). In supporting the establishment of these additional management positions for the CICS, it is evident that the existing Administration Officer position would need to be retained and a further clerk recruited to support budgetary and accounting activity for acquittal of programme expenditures. At least one additional word processor operator will also be required to support greatly increased CICS administration requirements.

Some of the positions in the Implementation Unit considered necessary in the SOE would be funded under projects such as the FAO Soil Conservation Project and the New Zealand-funded Reforestation Project. Others are addressed in the programmes generated under the NEMS. These are tabulated in Part III of the NEMS (Implementation and review).

It will not always be possible to recruit trained Cook Islanders (whether in the Cook Islands or New Zealand) to fill some specialist positions required in the near future for NEMS programme implementation. Because of this, it will be necessary to engage expatriate specialists on short-term consultancy engagements, or as secondments. The perceived likely needs for expatriate assistance are tabulated also in Part III. It is expected that in due course some of the trainee Conservation Officers will become junior counterparts to expatriate specialists.

Environmental infrastructure

For some years the CICS occupied a small office with a floor area of 60 sq m located on the foreshore in the grounds of the Ministry of Agriculture. The space was inadequate to accommodate the needs of the eight existing CICS staff, and would become quite untenable with recruitment of additional staff. The construction of an additional 126 sq m of floor space has commenced recently within the grounds of the Ministry of Agriculture and well back from the foreshore. The provision in the footings for the construction of a second floor would provide for future expansion needs.

The CICS is also not well endowed with basic office and technical equipment needed for its management, technical and administration functions. Pre-eminent among those needs is adequate transport for field monitoring staff in particular, and for office support. Further needs for equipment such as computers etc. are addressed within the context of individual NEMS programmes.

Programmes

1.2.1 *Strengthened environmental roles for existing institutions*

This action proposes the development by the CICS of a consolidated policy proposal for consideration by Cabinet which would aim, simultaneously, to strengthen the environmental roles of the CICS, Island Councils and Government Ministries. The Cabinet Submission would include proposals for:

1) the appointment of additional technical staff to the CICS;
2) the appointment and outposting of CICS conservation officers to selected islands under the local direction of the Island Councils; and
3) the designation of staffing positions as environmental officer/s within line Ministries.

1.2.2 *Co-ordinating Committee of Permanent Secretaries*	The proposed reconstitution of this committee is a matter for internal government consideration. Such a committee meeting on a monthly basis would assist the co-ordination of government programmes and would constitute an appropriately senior group for consultation on sustainable development issues facing the country. It is suggested that this Co-ordinating Committee would be reconstituted with a minor revamping of the current Task Force on Environment and Development.
1.2.3 *Environmental comment on Cabinet submissions*	In the process of submitting proposals to Cabinet for their consideration it is standard practice for submissions to be accompanied by comment from key areas of the government's bureaucracy—usually the Public Service Commission, the Department of Finance and MOPED. It is proposed that the procedure for submission of documents to Cabinet be modified to require socio-environmental comment from the CICS routinely, along with the standard comment from other key bodies. It is considered that such a simple move would have a profound effect on the attitudes of government departments towards environmental considerations.
1.2.4 *The One Stop Shop*	The establishment of a One Stop Shop is another internal matter for the CIG. It is proposed that MOPED be charged with the task of thinking through the administrative operation of a One Stop Shop and subsequently preparing a submission for Cabinet consideration.

Strategy 1.3

Adopt Environmental Impact Assessment as routine procedure

There is no formal requirement at present in the Cook Islands to evaluate the environmental impacts of all proposed projects, that is, their sociological, ecological, and cultural effects.

There is, therefore, also little attempt to monitor the environmental impacts, for example, of completed projects for land and infrastructure development to ensure projects remain socially acceptable and ecologically sustainable.

EIA is an analytical management procedure which is used to predict the likely economic, social, cultural, and biological consequences of a proposed development activity or policy—that is, its likely effect on the environment. As such, EIA is a very important planning tool for government as it assists the early identification of potential problems, and hence aids planning to prevent or to reduce adverse impacts to acceptable levels before investment is committed.

EIA can be conducted at all levels, from a simple 10-minute environmental questionnaire to the preparation of a detailed Environmental Impact Statement. Such comprehensive EIA is applied only to a development project which a preliminary screening indicates

is likely to have major economic, social, cultural, or biological impacts. The size of proposed economic investment is no guide to environmental risk and thus must not be used as a screening criterion. (Some screening criteria are suggested below.)

EIA must be applied without distinction to both government and private sector projects, foreign and local. Equally importantly, EIA must be applied to the policy-making process where it may affect the social, cultural, physical or natural environment.

The following recommendations are made for EIA operation in the Cook Islands.

At the national level

The Conservation Service be responsible for:

1) setting guidelines for when EIA is needed and how EIA should be done;
2) setting minimum environmental standards for water and air quality, noise control and waste management;
3) setting guidelines for the management of endangered species, cultural and historic sites, and activities outside the 12-mile limit;
4) approving or not approving proposed projects funded by external donor agencies for which EIA is requested;
5) evaluating the environmental costs and benefits of development proposals by both the private and public sectors, where necessary instituting in-depth EIA; and
6) monitoring the environmental performance of Island Councils with respect to the implementation of EIA guidelines and environmental quality standards.

At the local government level

The Island Councils would have primary responsibility for environmental management and be responsible for:

1) ensuring national environmental guidelines and standards are adopted. The Island Councils, however, may apply more stringent controls;
2) preparing environmental regulations compatible with national laws and standards;
3) determining if the environmental impact of a proposal is likely to be significant, thus requiring preparation of an Environmental Impact Statement;
4) making the *final* determination on project approval for all publicly and privately funded projects to be implemented on that island for which EIA has been satisfactorily undertaken. For those projects which have been funded by external donor agencies, the Island Council concerned would make a recommendation to the Conservation Service as to whether a project proposal should be approved and if so under what conditions;
5) monitoring the performance of projects which have received environmental approval; and
6) setting clear environmental guidelines in consultation with other relevant agencies on the following resource uses/activities:
   - earthmoving
   - forestry
   - watershed management
   - mining, within the 12-mile limit
   - natural habitat and wildlife protection
   - marine resources management.

These guidelines would be compatible with and not diminish those guidelines established at the national level.

The Island Council would ensure that *all categories of project proposals* benefit from EIA. Three categories are envisaged for screening projects:

Category 1 Simple, low-key projects for which conditions can be attached to permits.

Category 2 Project proposals requiring preliminary environmental assessment (say, 2-20 page report).

Category 3 Project proposals requiring comprehensive environmental assessment involving the preparation of an Environmental Impact Statement.

The criteria which would trigger a Category 3 determination for requiring an Environmental Impact Statement are:

1) The project is likely to cause a significant impact on:
   - water quality
   - air quality
   - marine resources
   - cultural/historical resources
   - plants and animals
   - any sensitive environment.
2) The project is likely to significantly disturb more than 1,000 sq m of land surface.
3) The project is likely to require more than 5,000 cu m of fill.
4) The project is likely to fail to comply with national minimum environmental quality standards for water and air quality, noise control and waste management.
5) The project is likely to be incompatible with surrounding land uses.
6) The project is likely to be controversial.

For all projects which are likely to have a significant environmental impact and are allowed to go ahead:

1) an environmental management programme should be included in the project design document; and
2) the capacity for proper monitoring be assured (from either internal or external sources), to allow the outcome to be compared with the predicted effects and thus to permit adjustment of the planned development process.

With aid programmes, EIA should always be undertaken early in the project cycle. It should begin immediately from the country programming mission stage and continue through any pre-feasibility and feasibility stages. Therefore, it should be expected that funding agencies would include a person experienced in environmental appraisal in their team.

But the first step to the proper use of EIA is to establish guidelines and set minimum environmental standards. It is here that the Cook Islands needs assistance. Standard guidelines must be prepared and approved (the screening guidelines above are a first attempt only at project categorisation; other forms of guidelines are required as well for the conduct of EIA). And minimum environmental standards must be prepared at the National level to allow Island Councils then to set their standards to match or exceed the National Standards.

Programme

***1.3.1** *Development of EIA guidelines & minimum environmental standards for National Government and Island Councils*

see Appendix 1, page 78

The development of EIA guidelines relevant to the Cook Islands was strongly advocated at the NEMS Seminar. However, guidelines on their own are not enough; they must be accompanied by detailed administrative procedures for their implementation. Environmental standards must also be set for air and water quality, noise pollution and waste management.

Strategy 1.4

Use economic policies to help achieve sustainable development

There are many economic instruments which countries can apply as a flexible and efficient means of promoting sustainable practices. The first step is to review existing monetary and fiscal policies for their impacts on sustainable resource management and environmental protection. Those taxes, *or* subsidies, which serve to damage ecosystems or resources, or which do not foster conservation (for example, water conservation or energy conservation) should be removed.

New economic instruments should also be considered. For example, together with the removal of direct or hidden subsidies is the equity principle that the user of a service should pay its full cost. Likewise, as most people by nature react quickly to economic disincentives, those who wilfully damage or pollute the environment must either correct the damage (if possible) at their own cost, or the community must pay and then recoup the outlay from the polluter. These principles, of course, are commonly known as "user pays" and "polluter pays" and many countries have found their introduction quite successful in curbing the more blatant environmental excesses.

For example, a brewery should pay the costs of any marine pollution or stream pollution it causes, as well as the full costs of all water, electricity and other services used in the beer production; likewise, a fish factory. Of course, the manufacturer will try to pass the cost on to customers, but is usually constrained by competition from other manufacturers who have more environmentally efficient manufacturing processes.

Pricing policies and standards can also be used to encourage industry to adopt resource-efficient technology. For example, high prices paid for imported fossil fuel, and for electricity produced from imported fuel, can stimulate the adoption of more fuel-efficient motors; in the house it could promote greater use of solar energy.

The Cook Islands needs faster economic growth to secure satisfactory living standards for its growing population. Broad policies to support such economic need would conceivably include the following elements, adapted from *Caring for the Earth* (IUCN/UNEP/WWF, 1991):

1) a national strategy for sustainable use of resources;
2) provision of greater opportunities for productive employment to raise incomes and spread the benefits throughout the population. More industrialisation is urgently needed, but must be done in ways that safeguard the environment;
3) action to promote private initiative, encourage the growth of the private sector, and the development of small and medium-sized enterprises, particularly the granting of credit to the cash poor and assetless;
4) action and investment to improve the institutional and regulatory framework for environmental management;
5) 10–15 per cent of gross domestic product invested in future skills;
6) action to ensure that decisions about priorities and resource allocations are made locally;
7) allocation of more resources to Outer Islands to reduce rural-urban disparities;
8) action to ensure that women play a full part in the process of national development;
9) encouragement of greater use of health and educational facilities;
10) action to promote foreign investment, such as the transfer of technology which will allow environmentally sound industrialisation;

11) action to help people undertake their own development through participation in development decisions, vocational training, and other skill development; and

12) monitoring the state of the environment to provide a basis for continuing adaptation of policy.

The Cook Islands is actively addressing some of these policy elements for sustainable development; the challenge of others has yet to be taken up.

Programme

***1.4.1** *Environmental resource accounting*

see Appendix 1, page 80

There is often little appreciation of the true worth to the community of a nation's natural resources. Like people elsewhere, Cook Islands people are inclined to take their natural assets for granted and even regard resources as inexhaustible. As an instrument for sustainable development, there is a need to place dollar values on natural resources in order to impose realistic costs on the development or utilisation of those resources according to resource scarcity. However, the assessment of real values for natural resources is not simple. This programme would:

1) investigate the development of an appropriate mechanism for environmental and resource accounting;

2) establish a database of current base values for those resources of greatest importance to the people; and

3) institute training in resource accounting for senior and mid-level management.

GOAL 2

Improve environmental awareness & education

Two strategies have been identified for achieving this objective of improving environmental awareness and education.

Effective long-term environmental management will require an informed and supportive public. The CIG recognises the importance of a clear understanding by Cook Islanders of the need for sound environmental management and protection of its limited resource base if its sustainable development principles are to be achieved. It also sees the urgent need to correct the misconception prevalent within bureaucratic circles and in the community at large that the aims of economic development and environmental conservation are diametrically opposed.

The RETA has training on EIA as one major focus of its activities and this training will be directed to relevant personnel of both public and private sectors, and involve the Outer Islands as well as Rarotonga-based persons. But, of necessity, this training will reach only a limited number of people in the first instance; the need to raise the level of environmental awareness is for all Cook Islanders, not just for those involved in project development and appraisal. This is the first strategy (2.1).

There is also a clearly recognised need for traditional knowledge to be integrated into environmental awareness programmes. Knowledge and application of beneficial practices (such as the *ra'ui*), traditional fishing techniques, and traditional medicine are fading and there is a need for comprehensive documentation of practices, and for the promotion of their continued use. This is the second strategy (2.2).

Strategy 2.1

Increase environmental training & public information activity

There is a need to raise the level of environmental awareness at all levels of Cook Islands society: the village level; school children; the private business sector; non-governmental organisations; and government bureaucrats, at both the resource management and the highest administrative levels. The more that people know about, are concerned with, and speak out on environmental issues, the greater and more positive is the flow-on effect, nationwide.

At the village level

The need for increased awareness is particularly apparent at the village community level. It is the resource owners who decide what activities will occur on their land, and it is therefore they who have the greatest potential effect on the environment of the Cook Islands. Consequently, resource owners should be the prime target for awareness-raising programmes.

Youth groups should be a prime target for raising environmental awareness. (photo courtesy of Cook Islands Tourist Authority)

If resource owners are informed about initiatives such as the development of environmental legislation and why it is thought to be necessary, they are more likely to understand and comply. If such awareness raising does not occur, the chances of successfully implementing environmental and resource management programmes on traditionally owned land are greatly reduced.

The village campaign may benefit from the promotion of dance, song and mime with an environmental message. Such traditional art forms would serve as an enjoyable medium for increasing understanding of the value of the natural resources and the environmental benefits of the practice of *ra'ui*.

There may be merit in the incorporation of youth groups and students, both on Rarotonga and the Outer Islands, in the production and performance of plays (including mime) and dances. A co-ordinator would be needed to help produce the plays and dances. With local input on play and dance topics and local involvement in performances, a large cross-section of the community would be involved and greater interest generated in performances.

School children

It is a truism that the children of today are the decision makers of tomorrow. As such, children must be adequately informed about their environment. The need for school children to be more aware of environmental issues at both the primary and secondary school level was strongly emphasised at the NEMS Seminar. Such education is essential to bring about a change in future community attitudes towards the environment of the Cook Islands.

Some environmental education is currently included in primary and secondary curicula but there is a clear need to incorporate more environmentally specific curricula. The emphases of curriculum development would vary with the level of education. For example, at the primary level the emphasis would be on the

integration of environmental topics within existing subjects, while at the secondary level the emphasis would be more on separate courses and subjects on environmental management. The development of environmental teaching aids will reflect the needs identified through developing environmental curricula. This will involve a specialist working closely with educators and relevant government departments.

From the earliest school age Environmental Studies should be introduced so that conservation issues are addressed in conjunction with underlying scientific principles. Environmental Studies should instil in school children an understanding of the difference between biodegradable and non-biodegradable products and the different disposal needs, for example, of a coke can compared with a coconut. As the disposal of wastes is a major problem in the Cook Islands, the maximum utilisation of local biodegradable materials rather than imported non-biodegradable substitutes should be emphasised. The curricula should focus on such simple illustrations to convey important environmental messages.

However, while there is ample scope for improvement of the environmental content of school curricula, this may not be where the major problem lies. Teachers have busy work schedules, and are understandably reluctant to put extra effort into changing their lessons to include conservation issues.

For maximum response, interesting, informative and relevant environmental material should be developed and presented to teachers during workshops for teachers already in service. Such in-service workshops would motivate and train teachers to include environmental education in their subjects. It would give them ideas on how to teach this information in interesting and informative ways. It would also bring them up to date with new initiatives being incorporated into the curriculum.

The government bureaucracy

A number of government officers, mainly from the Ministries of Agriculture, Fisheries and Health, reach a wide cross-section of the community through their routine extension activities. Many of their extension programmes are environmentally relevant. However, it should be noted that the training/work environment of extension officers commonly emphasises economic development, rather than the necessary integration of environmental and economic considerations. Through additional in-service training provided by the CICS, these officers could become more effective advocates for sustainable development.

There is a further need to raise the environmental awareness of all government officers, particularly those who plan resource use or manage resources, but most especially of the senior staff of ministries including the Permanent Secretaries and their deputies. The NEMS Seminar also considered that special attention should be paid to the education of politicians on ways in which environmental protection can be practised alongside economic development. The education of the Island Councils and Aronga Mana on sustainable development practices should also not be neglected; they should be kept well informed of practices which could affect the quality of their land.

A role for other organisations

While the CICS has a responsibility for informing the public on environmental issues, the responsibility for environmental education is not that of the CICS alone. Existing institutions should be encouraged to assist in the dissemination of information. It will, of course, be the Education Department which has the critical role to play within the schooling system. But there are a number of other institutions in the Cook Islands which could play an increased role in promoting awareness of environmental issues. Notable among these are the non-governmental organisations, particularly the churches and women's groups.

Women's groups include:

Cook Islands National Council of Women

Child Welfare Association

Cook Islands Business & Professional Women's Association

Cook Islands Nurses' Association

Cook Islands United Teachers' Association

Catholic Women's League

Cook Islands Christian Church Women's Ekalesia

LDS Relief Society

SDA Women (Dorcas)

Hospital Comforts Committee

Pan Pacific Southeast Asian Women's Association

Other organisations which can contribute to the implementation of environmental strategies include:

traditional leaders (House of Arikis and the Koutu Nui)

village committees

cultural groups

youth groups

service organisations (Lions Club, Rotary Club, Boys Brigade, Girl Guides)

fishing groups

growers association

Cook Islands Chamber of Commerce

In summary, this strategy aims for a sustained campaign to raise public awareness to be mounted throughout the country as an urgent necessity. The implementation of the strategy, through a set of programmes, would involve all forms of communication media (television, radio, newspapers, posters, and other printed material); development of specific curricula for the primary and secondary schools, vocational training centres, and theological colleges; training of existing agriculture, fisheries and health extension staff in correct environmental principles and practices; and organisation and conduct of workshops/conferences for the people of the Outer Islands through the Island Councils, for the people of Rarotonga through the House of Arikis and the Koutu Nui, and for government technicians, Heads of Departments, and the nation's policy makers in Parliament.

Programmes

*** 2.1.1** *Environmental awareness training*

see Appendix 1, page 82

Government officers have usually received training only within their technical specialisation. For them to take a broader environmental perspective, some in-service training would be required to increase their awareness of environmental issues and their appreciation of sustainable development principles.

This programme aims to:

1) train a range of people on particular issues of environmental importance, and encourage them to take their knowledge into the community and train others;
2) train government staff responsible for resource planning and management in sound environmental principles and practices;
3) establish a process to keep politicians, Island Councils and Aronga Mana informed of developments that could impact on their environment; and
4) encourage politicians, Island Councils and Aronga Mana to find ways in which economic development can proceed in an environmentally appropriate manner.

***2.1.2** *Environmental youth programme*

see Appendix 1, page 85

The use of environmental brochures, posters, and the like has its merits but is a "dry", passive process. Environmental messages are better communicated within the community in a participatory, fun way. This programme aims to increase environmental awareness by supporting students and youth groups on each island to develop their own environmental messages through plays, dance and song.

***2.1.3** *Environmental education in school curricula*

see Appendix 1, page 86

This programme will stimulate greater emphasis on environmental issues in the formal education process. The programme would develop lessons and teaching aids for primary and secondary levels, incorporating additional and locally relevant environmental material and, as such, build on current curriculum development efforts. The programme would also provide training for teachers on the use of the teaching material for the environmental curricula.

*** 2.1.4** *Environmental Information Officer*

see Appendix 1, page 88

The amount of accurate and relevant environmental information available to both government and community is quite limited. The communication of up-to-date information to the media, in particular, and to organisations with effective communication networks is a vital part of educating the public on conservation issues and raising awareness of sustainable development practices.

This programme would fund the local recruitment and training of an Environmental Information Officer for the production of factual environmental resource material in formats suitable for print, radio and TV media. Appropriate resource material would be provided on a regular basis to all media outlets to ensure a high profile is maintained on conservation issues.

*** 2.1.5** *Environment Resource Centre*

see Appendix 1, page 90

It is often difficult in the Cook Islands to obtain accurate, relevant and up-to-date information on the environment. What information is available in the way of reports, text books, pamphlets, posters, photographic slides and videos is scattered over a number of locations and not cross-indexed for ready access. There is a need for all environmentally relevant material to be indexed, particularly so the material now housed at the Conservation Service.

It is a fundamental role also of the Service to acquire more environmentally relevant information, not only print, film and sound, but also preserved biological specimens, geological samples and the like. This programme would assist to establish an Environment Resource Centre within the Conservation Service which would service the information needs of the community, schools and government departments. The programme would fund the recruitment and training of a librarian to operate the Environment Resource Centre.

*** 2.1.6** *National Biennial Environment Conference*

see Appendix 1, page 92

This programme aims at the ongoing process of strategy revision and development, assessment of effectiveness of programme implementation, recognition of new environmental concerns and further development of culturally attuned approaches to sustainable development. The proposed means is through the conduct every two years of a national environment conference involving traditional leaders, Government and Island Councils representatives, the churches, and other non-government organisations.

Strategy 2.2

Preserve traditional knowledge management systems

The inherent value of many good traditional systems as a base for developing new environmentally sustainable systems for resource utilisation is widely recognised today. These traditional systems must be protected and assessed. Where feasible, they can be enhanced.

The way many people now use and look after their resources indicates a rapidly occurring loss of traditional knowledge. Such loss could inhibit future attempts to maintain those traditional practices which may be important in the future for achieving sustained use of renewable resources. It is therefore very important to preserve traditional knowledge and practices in complete detail.

This strategy would be given initial effect through a programme to expand documentation of traditional knowledge and resource management systems; and to assess the use of elements of that knowledge in contemporary resource management.

Programme

*** 2.2.1** *Upgraded documentation of traditional environmental knowledge & practices*

see Appendix 1, page 94

This programme would boost current efforts at the preservation of environmental traditional knowledge and management systems through the creation of a two-year position in the CICS to gather information on plants, birds, animals, fish and other marine life; different traditional management systems; and traditional methods of canoe construction, fishing, sailing, navigation, medicine and healing.

GOAL 3

Manage & protect natural resources

Cook Islanders have long lived in close harmony with their environment. Careful husbandry of resources was fundamental to survival, and specific systems were developed (*ra'ui*) which included prohibitions by traditional leaders on the utilisation of certain resources, or specifications on the type and extent of utilisation. *Ra'ui* allowed resources to recover after a special event such as a feast, or sought to improve the yield of a particular resource.

The land area of the 15 islands of the Cook Islands comprises only 237 sq km. This is small but vitally important, agriculturally, to both the local economy and for export earnings. By contrast, the Exclusive Economic Zone (EEZ) is nearly 2 million sq km, one-fourth of the continental United States, and constituting, potentially, the most economically significant natural resources of the Cook Islands. There is an obvious need to exploit the under-utilised pelagic and deep-bottom fish resources of the EEZ, but exploitation must be planned to ensure a sustained yield of the nation's marine resources. Inshore, particular attention has to be paid to the conservative use of reef, reef-flat and lagoon resources which are gleaned daily for food near the main population centres. At the land-marine interface, the coastal zone is especially environmentally important. This is where most of the population lives and the area inherently most sensitive to environmental disturbance.

While the natural resources of the Cook Islands are not suffering from the environmental pressures faced by a number of other countries in the Pacific region, a number of environmental problems are becoming apparent and there is no room for complacency. There is a clear need to identify strategies and determine priorities for the management of the country's natural resources to ensure the problems are addressed swiftly, and to lay the foundation for their future sustainable use.

Four strategies were selected to address the prime objective of managing and protecting the natural resources of the Cook Islands:

1) support sustainable practices for the utilisation of the coastal zone;
2) support sustainable use of marine resources;
3) support sustainable use of land resources; and
4) establish and manage protected areas.

These strategies, together with selected, prioritised programmes for achieving those strategies are discussed in this chapter.

Strategy 3.1

Support sustainable, coastal resource use practices

The coastal zone is of utmost importance for Cook Islanders, being the place where most people live and work. It is also this zone, with its images of unspoilt, clean, white sand beaches and spectacular coastal scenery, which is a major drawcard for tourists. However, the coastal zone is also the most sensitive environmental zone in the Cook Islands and its use demands planning and careful management.

Coastal degradation and erosion are a major concern to the Cook Islands Government. In the Northern Group, coastal erosion is attributed mainly to natural causes. In the Southern Group, although there are a number of natural factors contributing to coastal erosion, most erosion is directly attributable to the actions of people. The degradation of coastal resources since the 1950s has been most notable on Rarotonga and Aitutaki. Removal of sand and aggregate material, construction of buildings and other structures (notably unplanned seawalls), and poor land-use practices on land adjacent to the coastal zone all take their toll on this fragile ecosystem.

Of these factors, the removal of sand and aggregate has been a particular concern. Enormous volumes have been removed from the coastal zone of Rarotonga since the 1950s for use in building and road construction, and the resulting beach degradation has created public pressure for control of the practice.

The unplanned construction of rock or concrete seawalls, or wave-deflecting structures in some areas of Rarotonga, has also induced severe coastal erosion through their interference with the natural hydraulics of water movement within the lagoon. Carefully planned engineering structures may, on the other hand, prevent accelerated erosion of the shoreline or help to rehabilitate eroded areas. Engineering-based solutions to coastal erosion problems include the design of coastal structures which work with natural forces rather than against them. Such an example is provided through the Coastal Management Units (CMUs) placed near the Rarotongan Hotel in 1991, which use natural forces to help restore a sand beach.

The loss of sand from beaches can mar an otherwise prime tourist asset. (photo courtesy of Cook Islands Tourist Authority)

Land use in areas adjacent to the coastal zone also cause degradation. Upland erosion resulting from poor agricultural practices, poor practices associated with engineering works, and poor maintenance of drainage channels has resulted in high suspended sediment loads in streamflow and overland flow, with the discharge of large volumes of silt into the lagoons. Such siltation is known to kill coral reefs and adversely affect lagoon productivity. Pollution from untreated sewage also degrades the coastal environment in a number of islands in both the Northern and Southern Groups.

The protection of the coastal zone calls for the progressive developing of a range of approaches, one of which is legislation. The Conservation Act 1986–87 specifically prohibited any activity in the foreshore zone without the prior consent of the Conservation Council. This covered activities such as the removal of sand and aggregate, and construction work. Despite the strong public concern over the extent of coastal erosion, compliance was poor. The current environmental legislation under consideration (a Bill for the Sustainable Use of the Environment) also includes similar provisions for coastal protection and proposes higher penalties for offences. Whether such penalties will adequately address problems of poor compliance remains to be seen.

The development of legislation cannot be considered in isolation. Rather, there is a need for clear and effective coastal planning in conjunction with legislative action. Such planning should identify areas at risk and develop appropriate response strategies, and those strategies should take into full account the large body of traditional knowledge on resource protection. Such planning must necessarily involve close consultation with traditional and elected leaders, and with the wider community. Any coastal management plans which are developed should also incorporate an educational component to strengthen community awareness on the need for coastal protection.

A study of coastal protection and port improvement has recently been undertaken by JICA, in close co-operation with relevant agencies of the Cook Islands Government. This study focused on the protection of the coastal zone of Rarotonga against cyclones and other severe storm events, and should serve as base for the development of a Coastal Zone Management Plan for Rarotonga.

The fundamental problem of removal of sand and aggregate material from the coastal zone also must be addressed. This is likely to continue unless some economically viable alternative source of construction grade sand is established. Locating an alternative source of sand and aggregate should therefore receive high priority. One recognised possible source is the detritus at the ocean outfall of the passages in the fringing reef.

Programmes

*** 3.1.1** *Development of a Coastal Zone Management Plan for the Cook Islands*

A national plan would be prepared which identifies areas most at risk from erosion and other forms of coastal degradation, develops guidelines for the protection of coastal areas, and incorporates traditional knowledge in its proposed management practices.

see Appendix 1, page 96

***3.1.2** *Alternative sources of construction sand & aggregate on Rarotonga*

This is a programme to assess the economic and environmental feasibility of recapturing sand and aggregate deposits from the ocean outfalls of reef passages of Rarotonga for use in construction.

see Appendix 1, page 98

Strategy 3.2

Support sustainable use of marine resources

The marine resources of the Cook Islands have great significance for the government and people of the Cook Islands. The better utilisation of offshore marine resources and the development of mariculture (pearl fishing, giant clam, and trochus shell farming) are areas of economic development attracting the strong support of the Cook Islands Government. Such development is promoted under the CIG policy of "pursuing ... sound economic exploitation, management and conservation" and "maintaining strict management and environmental controls over the lagoons to prevent diseases and pollution ..." (pre-election Manifesto of the Cook Islands Party).

The Ministry of Marine Resources is primarily responsible for the management of marine resources. The Marine Resources Act 1989 provides for the management and development of fisheries and related matters. It empowers Island Councils together with local fisheries committees to manage and develop fisheries resources, which include all aquatic plants and animals. Future development of marine resources will focus on:

1) extension of local pelagic fishery;
2) mariculture, particularly pearl farming;
3) maximising economic return from the fishing of the EEZ by foreign nations;
4) recreational fishing opportunities;
5) tourism as it relates to tropical fish and shellfish; and
6) the proximity to the productive albacore tuna fisheries in the waters south of the Cook Islands (National Resources and Development Strategy, 1992–1994).

Fishing activity has in the past been primarily of a subsistence nature and focused inshore on reefs and lagoons, or a part-time commercial activity for a few fishermen. This is changing, with increasing commercial fishing activity being encouraged through the placement of fish aggregating devices (FADs) and the refinement of fishing techniques. However, the annual subsistence catch currently exceeds the commercial harvest. Any practices which adversely affect the inshore fisheries resources are therefore of great concern.

Specific concerns about the inshore fishery raised at the National Environment Seminar included:

1) use of natural fish poisons, particularly derris root *('ora papua)* and barringtonia seeds *('utu)* which can prove toxic to coral polyps and small fish which are important linkages within the marine food chain;
2) destructive fishing with dynamite, which has been reported in some areas of Rarotonga and Aitutaki;
3) the use of gill-nets with mesh sizes smaller than 3.5 inches, which indiscriminately harvests the smaller fish necessary for maintenance of the lagoon food chain; and
4) the uncontrolled and increasing use of SCUBA with spear guns for commercial fishing for reef species.

There is thus a need for greater controls over such practices and the imposition of appropriate, communally approved penalties. Specific actions that could be considered include: bans on netting in Avatiu and Avarua Harbours; bans on nets in front of traditional fish traps (*pa*); enforcing the use of appropriate mesh sizes of fishing nets; and bans on the use of SCUBA for fishing within lagoons.

The Cook Islands is now producing increasing numbers of black pearls, with the pearl-farming industry rapidly becoming of major economic importance. Indeed, the development of the black pearl industry is identified as a key element of the Government's Natural Resources and Development Strategy, 1992–1994. All cultured pearls are currently grown in Manihiki, but it is proposed to expand the industry to other islands of the Northern Group such as Penrhyn, where natural pearls have been harvested for many years.

If pearl farming is not carefully controlled, there could be major environmental problems in the Northern Group. French Polynesia has already experienced such problems, with pearl shells and other shellfish species being virtually wiped out of some lagoons by disease. At Manihiki itself, the protection of the lagoon environment is fundamental to the development of the industry. The extent of lagoon pollution in Manihiki is increasing due to a number of factors including sewage and poor pearl-farming practices. There is thus a need for a plan of management which would aim to protect the rapidly growing pearl-farming industry based in the lagoon, thus contributing to the sustained development of the industry and of Manihiki Island itself.

Programmes

*** 3.2.1** *Development of an environmental management & monitoring plan for Manihiki Lagoon*

see Appendix 1, page 100

The plan of management will entail the conduct of a baseline survey of current environmental health of the lagoon; the identification of specific management actions to be undertaken; and the recruitment of two CICS officers to be outposted to Manihiki for routine monitoring of environmental factors affecting the lagoon, operating under the day-to-day direction of the Manihiki Island Council.

*** 3.2.2** *Development of policies & procedures to minimise overfishing of reefs & lagoons*

see Appendix 1, page 103

This programme would fund a two-year secondment to the Ministry of Marine Resources of a marine resources expert with particular experience in assessment of fish stocks, preferably in a Pacific Island environment. This expert would be supported by a Cook Islands Maori-speaking counterpart who is familiar with Cook Island customs and practices. Complementing this programme would be a major community education programme directed at countering unsustainable fishing practices.

Coastal erosion is a major environmental problem. All development must be carefully planned to minimise disturbance to the coastal zone. (photo courtesy of Cook Islands Conservation Service)

Strategy 3.3

Support sustainable use of land resources

Its meagre land resources are critical to the Cook Islands if current self-reliance for most food is to be maintained. Poor land-use planning and management practices can lead to major impacts, for the social and cultural environment as well as for the land resources themselves. For example, the unplanned physical development of commercial and industrial ventures has led in the past to serious degradation of adjacent lagoon and reef systems on Rarotonga.

Except for a small area of Crown Land used for public purposes, all land is in the hands of the people. The sale of land is prohibited and the only permitted transfers, other than inheritance, are by lease and occupation rights (Crocombe, 1987). The complex tenurial arrangements make it difficult to impose comprehensive land use controls in a Western sense, and this underscores the importance of consultation and co-operation with traditional landowners and leaders in seeking to change existing patterns of land use.

Soil erosion is the major land management problem in the Cook Islands, much of it resulting from poor agricultural practices. Some land areas in the Cook Islands are being intensively cultivated due to occupation rights arrangements, or for the development of commercial-scale agricultural monoculture, such as pineapples. Cultivation on steep slopes or the use of inappropriate techniques has led to severe erosion in a number of islands. Erosion has also arisen from poor road construction, excavation of house sites and, on Rarotonga, the excavation of soil borrow-pits for filling in coastal wetland to create building sites.

The root cause of these accelerated erosion problems is ignorance and a prevalent attitude by landowners that, by tradition, they can do anything they wish on their own land, even if it does impact on the rights of others. There are no proper guidelines and planning for new projects, and there is no comprehensive land rehabilitation programme, although a major start has been made with successful reforestation programmes. Currently, there is also little public will to observe such planning guidelines.

Two programmes are outlined in this strategy. One deals with the development of guidelines for soil management to minimise soil loss arising from land management activities. The second relates to the expansion of existing reforestation programmes.

Programmes

***3.3.1** Development of soil management guidelines*

see Appendix 1, page 104

This programme would fund the recruitment of a soil conservation specialist for a period of six months to develop soil conservation guidelines for land development activities which are likely to induce accelerated erosion. The specialist would develop an administrative system under the Act which makes these guidelines binding on all public and private sector activity which involves significant soil disturbance. The specialist's time would be split over a period of 12 months, during which he would be supported in-country by a Cook Islands Maori-speaker with agriculture/soil erosion training who would be attached to the Ministry of Agriculture.

***3.3.2** Reforestation of grassland & eroded areas*

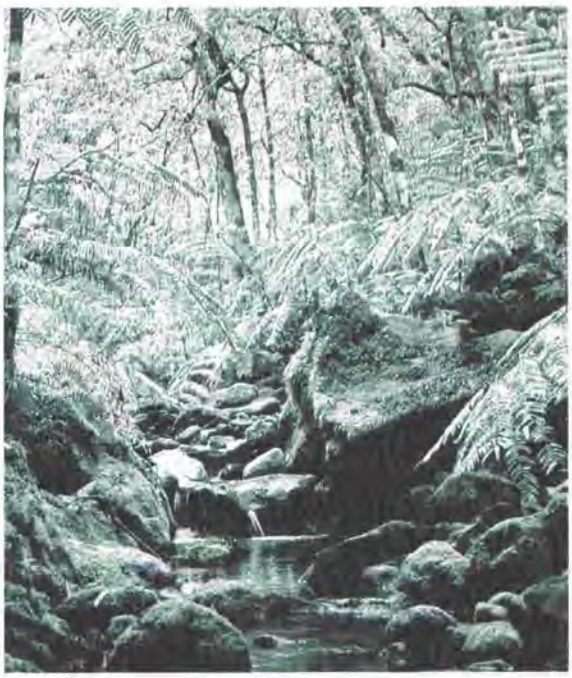
see Appendix 1, page 106

The Forestry Division of the Ministry of Agriculture would receive supplementary funding over a two-year period to permit an acceleration of the planned reforestation programme on Mauke and Rarotonga. The programme would include funds for improving fire protection for the reforested areas.

Strategy 3.4

Establish & manage protected areas

The need for conservation of areas of special ecological, archaeological, historic, or aesthetic value is now commonly accepted world-wide. It is a need founded on common sense. Through the protection of such areas mankind helps ensure that ecological processes and life support systems are maintained, genetic diversity preserved, and ecosystems and species utilised in a manner which is sustainable.



The aesthetic appeal of such beautiful areas as this Rarotonga valley can only be protected with the full co-operation of customary landowners. (photo courtesy of Cook Islands Conservation Service)

The protection of areas and species of special significance is not a new concept in the Cook Islands. However, it has traditionally been achieved through means other than the formal reservation of land and marine areas, such as the imposition of *ra'ui* on the use of resources. To date, there has been limited development of formal protected areas in the Cook Islands. The only formally established protected area to date is Suwarrow National Park, 0.4 sq km in area. A number of other protected areas have been investigated.

The selection of areas for which special protection is considered necessary can only be done in close consultation with the Island Councils and with the full cooperation of customary landowners. The Tourism Master Plan identifies a number of potential reserve areas which could be developed to assist with nature-based tourism on the Outer Islands.

Programmes

*** 3.4.1** *Development of tourism-based conservation areas*

see Appendix 1, page 108

The linkage of conservation and tourism is seen as having great potential for developing protected areas on Rarotonga and the Outer Islands. This programme has been developed to focus attention on this concept with respect to the Outer Islands. The programme will investigate specific proposals arising from the Tourism Master Plan, with the objective of establishing a number of conservation areas in the Outer Islands, where these are supported by the Island Councils. Management plans would be developed for agreed areas and implemented through Island Councils with landowners retaining overall management control. The main focus for establishing conservation areas would be on Atiu, Mangaia and Penrhyn.

***3.4.2** *Application of traditional knowledge to resource conservation practices*

see Appendix 1, page 109

The existing CICS programme for protection of the herbs and shrubs used in traditional Cook Islands Maori medicine and documentation of their usage for the benefit of future generations is an important early initiative in the preservation of traditional knowledge. This NEMS programme supports an expansion of that programme through:

1) the engagement of traditional studies research advisers to establish a systematic programme for documenting and evaluating traditional resource conservation practices;
2) an inventory of traditional medicinal plants used in Cook Island communities; and
3) the establishment on Rarotonga of a herb garden or arboretum for traditional medicine plants.

The proposed programme would fund the recruitment of an assistant to support the existing CICS Traditional Specialist for two years.

GOAL 4
Manage waste & control pollution

The increasing volume of solid waste and its disposal is a major problem for the Cook Islands. The acquisition of suitable sites for garbage dumps is particularly difficult due to lack of suitable land, while management of the sites currently used is generally poor, and the local cause of a number of environmental problems. The disposal of sewage is a problem, particularly so on Rarotonga and atolls such as Manihiki. Septic systems are overloaded, sometimes poorly sited, causing pollution from effluent discharge. Water pollution is a particular concern, but the extent and severity is unknown because of the lack of routine monitoring.

The improper use and disposal of agricultural and other hazardous chemicals is a matter of concern for pollution of soil and water, and thence through the food chain to the population. This concern is particularly strong for areas where large volumes of biocides have been used for commercial fruit production. But, without monitoring of chemical residues in food, occurrences of contamination which could seriously impair human health cannot be detected and corrective action taken.

Because of contamination, groundwater on some atolls is unfit for human use, apart from washing. Due to the limited supply of groundwater plus the threat of contamination, most atolls rely on rainwater catchment and storage systems. The CIG has had a major

Modern packaging is a significant component of solid waste. Poorly managed garbage dumps are a significant environmental problem. (photo courtesy of Cook Islands Conservation Service)

programme to promote household and community rainwater storages; this should be continued and storage capacity increased.

The risk of marine pollution from an oil spill is often thought of as remote until it happens. No area of the world is safe from accidents which can lead to such potentially catastrophic spills, and environmental planning must therefore cope with that risk. Practical training needs to be provided to key public and private sector personnel in both Southern and Northern Groups.

Similarly, the problem of fuel spills on land, such as those which have occurred at the main fuel supply outlets and at the premises of major fuel users (such as the Electric Power Supply plants and the modernised bakeries on Rarotonga), should be addressed through practical training programmes.

Another area of waste of considerable economic concern is that of energy. This is produced from diesel-powered generators, the diesel being imported at high cost. Where diesel is then shipped in drums to the Outer Islands, freight charges make the landed cost extremely high. Consequently, the CIG is keen to explore more cost-effective forms of electricity for the Outer Islands, among which photovoltaic systems appear to hold some promise. Other forms of renewable energy will also be investigated as cost-effective supplements to existing forms of energy.

Strategy 4.1

Improve disposal of solid wastes & sewage

Solid waste disposal

It is currently estimated that the Cook Islands has to dispose of more than 9,000 cu m of rubbish each year. Such disposal presents a major and increasingly more urgent problem for the Cook Islands, as it is does for all small island nations with severe land limitations. The increasing volume of solid waste is attributed to the changing life-style of Cook Islanders. The demand for imported goods has led to the need for disposal of an increasing volume of packaging material made up, for the most part, of non-biodegradable plastics and aluminium beverage cans. And more organic waste, formerly burnt at home, is now taken to a public dump, as one consequence of the increasing use of gas and electric stoves.

On Rarotonga, because of the problem of acquiring land, swampland and former taro production areas are being used for solid waste disposal. The landowners in most cases see garbage disposal as a means of site reclamation for housing purposes. Dump management on Rarotonga is constrained because of fragmented effort between three government agencies and made even more difficult because the public are freely permitted to dump rubbish outside normal working hours. Poorly managed dumps cause water pollution, block drains, induce ponding which is a breeding ground for mosquitoes, provide a breeding ground for vermin, and have a foul odour. The management of Rarotonga rubbish dumps would therefore benefit from clarification of administrative responsibilities, regulatory control of dump access, and training of dump management staff.

Dump sites on the Outer Islands are the responsibility of the Island Councils. Rubbish collection on Rarotonga is undertaken by private contractors, and elsewhere in

the Southern Group by the government. In the Northern Group, solid waste is dumped on the foreshore.

Sewage disposal

Sewage disposal is a recognised problem, but the extent of the problem on each island has not been quantified; nor is there any routine monitoring of streamflow, groundwater, and marine water quality.

On Rarotonga, most households have septic tanks, but such systems are not suitable for larger hotels and motels handling large numbers of tourists. Septic tank sludge is spread on orchard lands as fertiliser. There is evidence in some Avarua households that sewage has contaminated the soil, and the incidence of algal growth along the Rarotonga foreshore and on some watercourses indicates an increased level of nutrient in surface runoff, although this may be partly attributable to nutrient leaching associated with the extensive use of fertilisers.

The effluent from larger hotels is discharged into the sea following a primary level of treatment; however, there is growing concern about the effectiveness of such waste treatment systems and currently one major hotel's system is inoperative. With the expanding tourism industry, plans for the construction of sewerage system and sewage treatment plants become urgent.

On the atolls, there is concern that the advocated use of pour-flush and pit toilets causes pollution of the shallow water table leading to a high incidence of gastro-intestinal disease. The use of alternate closed-system "bio-toilets" is advocated for such situations where wastes are composted and can be used to help maintain garden fertility of the infertile coralline soil.

Programmes

***4.1.1** Rarotonga waste disposal management*

see Appendix 1, page 111

This programme addresses the urgent need on Rarotonga to improve the disposal of solid and liquid wastes. It would entail a detailed feasibility study of alternative systems for sewage and solid waste disposal coupled with a design brief. A second phase would entail the calling of tenders for design, construction and commissioning of a sewerage system.

**** 4.1.2** Outer Islands solid waste disposal programme*

see Appendix 1, page 113

The programme would comprise the initiation of a garbage collection service under the control of the Island Council with separation of non-biodegradable from biodegradable rubbish at point of collection, and training of Council staff on waste handling and dump site management. The programme would also include householder education on the separation of non-biodegradable rubbish from other household refuse which will rot and can be used for garden compost; and householder training on effective composting techniques.

***4.1.3** *Outer Island sanitation demonstration programme*

see Appendix 1, page 114

This would be a demonstration exercise to create in the communities of the Outer Islands an awareness of the hygiene advantages of modern bio-toilet composting systems designed for an outer island, low water supply situation. The demonstration would be undertaken at schools on Manihiki, Rakahanga and Penrhyn.

***4.1.4** *Water quality monitoring programme on Rarotonga & Aitutaki*

see Appendix 1, page 116

This programme would firstly establish a comprehensive set of baseline data for a selected range of sites on the two islands for water quality (marine and fresh water) which is fundamental to later institution of routine monitoring of water quality. A routine system would be devised and instituted for monitoring water quality, and both Cook Islands staff and a counterpart manager trained to continue water quality monitoring beyond programme life.

Strategy 4.2

Improve supply of safe drinking water

Without an adequate water supply, sustainable development cannot be achieved. The CIG is acutely conscious that an assurance of sufficient volumes of high quality drinking water is basic to an improved quality of life for Cook Islanders. On Rarotonga this water is sourced from the watersheds of the mountainous interior of the island, and supply is not yet a major problem. In the atolls, where the groundwater resource is fragile and prone to contamination from human wastes and salt intrusion, rainwater tanks and cisterns provide the main source of drinking water. Alternative means of fresh water supply are suggested from time to time including desalination systems, but they are expensive to install and particularly so to maintain. Nothing has been shown to be better economically, and certainly not simpler, than collection of rainwater.

Rainwater is plentiful during the wet season, but during an extended dry season of three months or more, current storage facilities are insufficient. The demand for potable water has exceeded available storage capacity even for routine use. In the event of an extended drought, the atolls are vulnerable with respect to water supplies. Hence, the design, construction and maintenance of adequate water storage is a key issue. The CIG Water Tank Programme for a number of the islands of the Northern Group aims to provide sufficient water to satisfy basic needs at both the individual household and community levels; tank size is 4500 L (1000 gall). However, it is desirable that storage volume be at least 9000 L (2000 gall) per household, assuming an average household of four persons with minimum usage of 25 L per day per person, and a likely three-month dry period. While atoll dwellers were once renowned for their frugal use of fresh water (using the sea for bathing and coconuts for drinking), 25 L per person for drinking, cooking, bathing, and other household needs is a bare daily minimum requirement today.

Programme

***4.2.1** Atoll water catchment & storage programme*

see Appendix 1, page 118

This is fundamentally a self-help programme directed to all people living on the atolls of the Northern Group to assist them to acquire safe, reliable and adequate supply of drinking water through establishing or upgrading of roof catchments and rainwater storage systems. This programme would supplement the existing CIG rainwater household and community storage programme. First funding priority would be given to households on Pukapuka and Nassau. The programme would also support the local manufacture of fibreglass tanks by private industry and encourage training on storage maintenance.

Strategy 4.3

Anticipate pollution emergencies

The only real major pollution emergency with which Cook Islands could be faced is that of accidental (or otherwise) spill of oil, with potential catastrophic consequences for marine life, reefs and beaches. The CIG is well aware of the risk and an oil spill contingency plan has been prepared. But any such plan will be only as effective as the training of the people who have to implement it in an emergency, and the equipment immediately available for the task. Practical training exercises need to be run in the Northern Group as well as on Rarotonga.

Programme

***4.3.1** Petrol/oil lubricant (POL) emergency response*

see Appendix 1, page 120

This programme would provide further training in practical, hands-on situations for public and private sector personnel likely to involved in any oil spill emergency. Necessary equipment and chemicals would be purchased and training given in their use.

Strategy 4.4

Use & abuse of hazardous chemicals

The possible cumulative effects of biocide residues and heavy metals is considered by the Conservation Service to be an area of significant concern. However, the real extent of the problem of misuse of chemicals such as fungicides and pesticides is unknown as there is a lack of regular monitoring of soil, plant and water at one end of the production spectrum, and of meat, seafood, vegetables and fruit at the consumer end. There is a need for the establishment of routine monitoring systems and for the training of relevant field and laboratory staff. Chemical monitoring concerns the CICS, the Agriculture Department and the Public Health Department.

Programme

*** 4.4.1** *Environmental monitoring of hazardous chemicals*

This programme would establish the need and requirements for a system for routine monitoring of foods for pesticide residues, heavy metals, drugs, hormones, and other hazardous or toxic residues.

see Appendix 1, page 121

Strategy 4.5

Promote non-polluting forms of energy

The Cook Islands is completely dependent upon imported fuels for its commercial energy supplies, with imported fuels accounting for more than 90 per cent of all imports. The Department of Electricity Power Supply (EPS) supplies electricity to all islands through diesel generation sets with the exception of Pukapuka and Nassau. On some islands, electricity supply is not continuous but restricted to specified short periods.

The main fuel in the non-commercial sector is firewood which is still used on the Outer Islands for cooking in traditional ovens. On Rarotonga, there is an increasing use of gas cookers.

The government has actively sought to promote renewable sources of energy and to reduce the country's dependence on imported fuels. Most successful has been the introduction of domestic solar water heaters, which are produced locally. Photovoltaic systems have also been incorporated successfully in some of the Northern Group islands. Positive experience has also been acquired with steam generators fired by wood, and by small-scale waste incinerators.

On Rarotonga where there is an urgent need to upgrade electricity generation capacity to cope with expanding demands of industry and the tourism sector, the government has considered other electricity generation systems feeding into an island grid.

Programme

*** 4.5.1** *Northern Group solar electrification*

This programme aims to fund the installation of photovoltaic electrification systems in Manihiki, Rakahanga and Palmerston for basic household lighting and refrigeration. The Cook Islands already has experience with the successful introduction and maintenance of such systems, and aims to extend such technology to isolated Outer Islands where the cost of imported diesel for electricity generation is prohibitive.

see Appendix 1, page 123

part III

Implementation & review

Implementation

The implementation of these National Environment Management Strategies will be a major task which must involve the Cook Islands Government, Island Councils, House of Arikis, Koutu Nui, Aronga Mana, churches, other non-governmental organisations and the private sector if they are to have any real prospect of success. But some ministry or body has to steer that process and provide impetus and follow-through. It has been proposed in these NEMS that the overall implementing body be the Task Force on Environment and Development which would be retained beyond its original charter of the RETA and the National Report to UNCED, as well as being somewhat revamped and given powers of enforcement. Comprising, as it does, senior representatives from relevant areas of the public sector, the Conservation Council and the Chamber of Commerce, as well as proposed representation from Aronga Mana and the Council of Churches, this body is best placed to ensure the co-operation and co-ordination so vital to NEMS implementation.

A number of important principles will guide the implementation of these strategies and action programmes. Cook Islands ownership of the NEMS will be retained at all times, also the high level of cross-sectoral involvement and the intimate association of traditional leaders. Public education to raise environmental awareness is to be stressed and used at every opportunity. Environmental Impact Assessment as a constructive management tool must be stressed wherever possible. And while the Conservation Service will play the key roles of liaison and co-ordination for the Task Force during the NEMS implementation, it remains only one of many such bodies which must also play their part.

7.1 Principle of Cook Islands ownership

This NEMS process was conducted under the guidance of the Task Force for Environmental and Development and SPREP, with the Cook Islands Conservation Service taking the role of co-ordinator and catalyst. But the NEMS Report itself evolved from the intensive three-day Seminar on Rarotonga in March 1992, where the major environmental problems were discussed and defined, strategies developed to address priority problems, and action programmes identified to give effect to those strategies. In other words, the NEMS is not the brainchild of any one organisation, local or foreign; it flowed from the participants at the Seminar and, as such, belongs totally to the people of the Cook Islands.

The SPREP Resource Team assisted with production of a draft report of the NEMS in which the strategies explored at the seminar were faithfully reproduced. However, while SPREP assisted, the NEMS is not in any way a SPREP report. It belongs to the Cook Islands and its implementation and further development will at all stages be directed by the Government, traditional leaders and people of the Cook Islands. Were it otherwise, the prospect for strategies implementation would be seriously in doubt.

7.2 Implementation

As mentioned previously, implementation will not happen of itself. With the finalising of the the NEMS, SPREP's immediate role ends, though it will maintain a close interest in the implementation of the NEMS in the Cook Islands and do what it can within its financial and staffing constraints to provide requested assistance. But SPREP has a total of 21 developing country members, each bidding for assistance with the implementation of environmental programmes.

Also, while the Asian Development Bank has generously funded this RETA, that support does not imply its continuing commitment towards funding of programmes identified in the NEMS. It and other lending or donor agencies will consider programmes or programme packages on a case by case basis, but only following formal request through official channels.

Inevitably, therefore, much work lies ahead for the Cook Islands Government if these paper programmes are to be turned into on-ground actions.

7.3 Implementing agency

The Conservation Act 1986–87 established a Conservation Council which is currently responsible for the administration of the Act. The Conservation Service is the agency which discharges the responsibility given under the Act for the conservation and protection of the environment. The CICS is established as an autonomous corporate body responsible to the Minister for the Environment. However, under present legislative provisions of the Conservation Act 1986–87, the Conservation Service is hamstrung in the discharge of its responsibilities, a problem which the proposed Bill for an Environment Act aims to overcome.

Should the Environment Bill be enacted, an Agency for the Environment, comprising an Environment Council and an Environment Service, would be the body charged with national responsibility for environmental protection. The enactment of the proposed new legislation would obviously require the simultaneous expansion of the technical and administrative capacity of the Agency's Environment Service (that is, Conservation Service). Otherwise, it would be little better off than at present under the Conservation Act 1986–87. While the additional technical need is obvious, the administrative/managerial need may be less so; but it should be remembered that, in addition to servicing the needs of its own professional and technical staff, the new Environment Service would be required to act as the Secretariat for the Environment

Council, calling for far greater emphasis on communication, consultation and co-ordination on both Rarotonga and the Outer Islands.

The enactment of the Environment Bill would clearly assist the operation of the CICS. Should Parliament decide not to proceed with the Environment Bill, however, it is considered that special institutional strengthening of the Conservation Service will still be required if it is to be an effective instrument for the implementation of many of the programmes proposed under these NEMS.

In that event, apart from its own staff and infrastructure needs, one area of institutional strengthening which could be considered from the national viewpoint would be the retention of the existing Task Force on Environment and Development, but with its representation and mandate broadened to become, in effect, a Standing Committee to the Prime Minister on Sustainable Development, replacing the existing limited Conservation Council function. Such a body should have, as one of its major roles, the development of sustainable development policies for government consideration. It should also have the power to direct the CICS and other relevant government agencies on matters relating to the integration of economic development and environmental protection.

The membership of such a Standing Committee on Sustainable Development, it is suggested, should not exceed seven persons. These members would include representation from government, traditional leaders, private sector industry, non-governmental organisations and the churches.

In the interim, until either a new Environment Act comes into force or the existing Task Force on Environment and Development is restructured and its charter revamped, Task Force members could be divided into four operational sub-groups, each sub-group with a designated leader and charged with the responsibility to pursue one of the four main goals of the National Environmental Management Strategies. Through such division of interest and effort, more can be achieved in a shorter time span. It is suggested that the Chair of the Task Force should remain with the Prime Minister's Department.

Such implementation should continue to foster the broader perspective taken by the Conservation Service on sustainable development since the establishment of the Task Force, and ensure the Service's programmed activity does not reduce to a narrower conservation stance.

7.4 Staff needs for NEMS programmes

Without the funding of additional local staff positions and the hire of specialist advisers these NEMS programmes simply will not happen. The need for expatriates is indicated only where the necessary skills are not available in-country, and their engagement is generally seen as a short duration contract, not exceeding a few months. The exceptions are a couple of complex programmes which require specialist skills over a longer time period; for these, secondment is seen as an appropriate recruitment mechanism.

In each case where the need for outside assistance is indicated, provision is made for the recruitment and training of local counterpart staff. The proposed additional local staff requirements and short-term needs for expatriate staff are tabulated below.

Local staff requirements for NEMS programme implementation

Staff needs	Location	Total period	Programme
Development			
EIA Officer Counterpart	CICS Rarotonga	2 yrs	1.3.1
Economist	MOF Rarotonga	3 mths	1.4.1
Education and public awareness			
Environmental Youth Programme Coordinator	CICS Rarotonga	1 yr	2.1.2
Environmental Education Curriculum Consultant	MED Rarotonga	2 yrs	2.1.3
Environmental Information Officer	CICS Rarotonga	2 yrs	2.1.4
Environmental Resource Centre Librarian	CICS Rarotonga	2 yrs	2.1.5
Traditional knowledge/systems			
Senior Environmental Officer (Traditional Practices)	CICS Rarotonga	2 yrs	2.2.1
Environmental Officer (Traditional Practices)	CICS Rarotonga	2 yrs	3.4.2
Environmental monitoring			
Environmental Officer (Monitoring)	CICS Manihiki (Tukao)	3 yrs	3.2.1
Environmental Officer (Monitoring)	CICS Manihiki (Tahunu)	3 yrs	3.2.1

Local staff requirements for NEMS programme implementation

Staff needs	Location	Total period	Programme
Environment sectors			
Marine Environmental Resources Officer Counterpart	MMR Rarotonga	2 yrs	3.2.2
Soil Conservation Officer Counterpart	MOA Rarotonga	1 yr	3.3.1
Environmental Health Officer	MOH Manihiki	2 yrs	4.1.3
Water Quality Monitoring Coordinator Counterpart	MOH Rarotonga	3 yrs	4.1.4

Expatriate staff requirements for NEMS programme implementation

Staff needs	Location	Total period	Programme
Development			
EIA Specialist	CICS Rarotonga	6 mths	1.3.1
Resource Economist	MOF Rarotonga	3 mths	1.4.1
Education and public awareness			
Environmental Education Specialists	CICS Rarotonga	1 mth	2.1.1
Librarian Consultant	CICS Rarotonga	3 mths	2.1.5
Traditional knowledge/systems			
Traditional Knowledge Research Specialist	CICS Rarotonga	6 mths	2.2.1
Traditional Systems Specialist	CICS Rarotonga	3 mths	3.4.2
Environmental monitoring			
Coastal Zone Management Specialists	CICS Rarotonga	1 yr	3.1.1
Environmental Management Specialist	CICS Manihiki	1 yr	3.2.1
Environment sectors			
Environmental Marine Resources Specialist	MMR Rarotonga	2 yrs	3.2.2
Soil Conservation Specialist	MOA Rarotonga	6 mths	3.3.1
Environmental Health Officer	MPH Manihiki	3 mths	4.1.3
Water Quality Specialist	MOH Rarotonga	1 yr	4.1.4

7.5 Estimated programme costs

The total estimated cost of the 26 fundable programmes identified by the NEMS is $7.795 million over a 5-year period, 1993–1997. Fifteen of these programmes are scheduled to commence in FY 1993, with another ten programmes in FY 1994. The remaining programme would commence in FY 1995.

Twenty-four of the proposed programmes together comprise $4.295 million, or 55 per cent of the total estimated cost. The two programmes which constitute 45 per cent ($3.5 million) of the total are an Atoll water catchment and storage programme ($1.4 million), and a Northern Group solar electrification programme ($2.1 million). It is possible these two programmes may be attractive for loan funding. Each of these two major programmes would contain significant purchases of capital items, provide opportunities for local private industry involvement, and have major social benefits. Both are directed at the relatively under-developed Northern Group.

Eleven programmes are short-term, not exceeding one year. Nine extend over two years, while six programmes would run over three years. Because of the lead time necessary for the implementation of larger, higher cost programmes, costs are expected to peak in FY 1994, when all except one of the programmes should be either completed or under way.

Of the 26 programmes, the CICS is indicated as the likely executing agency for 12 programmes. Primary execution of the remaining programmes is directed to the Crown Law Office (1), Ministry of Agriculture (3), Ministry of Education (1), Ministry of Finance (1), Ministry of Health (2), Ministry of Marine Resources (1), Ministry of Works (3), Island Councils (1), and a proposed Waste Management Authority. While it is to be expected that the Cook Islands Conservation Service would have prime responsibility for the implementation of the bulk of the NEMS programmes, proposed carriage for 14 programmes is spread widely among Government Ministries and the Island Councils, although close consultation with the CICS would be expected. Implementation of the NEMS therefore will be a collective effort and not simply a matter to be left to the CICS. Such multi-disciplinary and intra-administration effort reinforces the importance of the continued central role of the Task Force on Environment and Development.

Cost estimates for five-year proposed NEMS programmes (FY 1993 – FY 1997)

Estimated programme costs by financial year ($'000)

Programme	1993	1994	1995	1996	1997	Total
1.1.2	140					140
1.3.1	92	48				140
1.4.1	70					70
2.1.1		130	85	85		300
2.1.2	45					45
2.1.3	70	70				140
2.1.4	150	100				250
2.1.5		85	55			140
2.1.6		60				60
2.2.1		90	160			250
3.1.1		140				140
3.1.2	45					45
3.2.1	278	114	108			500
3.2.2	115	115				230
3.3.1	100					100
3.3.2	50	50				100
3.4.1	50					50
3.4.2	95	25				120
4.1.1		250				250
4.1.2		440	80	80		600
4.1.3		50	50			100
4.1.4		90	70	65		225
4.2.1			380	510	510	1,400
4.3.1	250					250
4.4.1	50					50
4.5.1		700	700	700		2,100
Total	**1,600**	**2,557**	**1,688**	**1,440**	**510**	**7,795**

Review

The National Environmental Management Strategies are in large measure a single picture in time, framed in accordance with the perceived political, economic, cultural, and other circumstances at the time of its formulation in 1992. No NEMS should be seen as a long-term blueprint for action. Ongoing review is needed, as well as a more comprehensive review of progress undertaken annually at the time of preparation of forward budget estimates and preparation of funding requests to donor agencies.

The increasing pace of change with increasing pressure for economic development makes any time frame for programming beyond a five-year span akin to crystal-ball gazing and not a sound basis for environmental planning and management. In fact, even forecasts for five years are notoriously unreliable. Therefore, towards the middle of the current CIG planning period of 1993–1997, and no later than 1995, a major review of the NEMS should be called. It is suggested such review might best be undertaken in conjunction with the proposed 1994 National Biennial Environment Conference. Review would assess achievement, identify gaps and their causes, and recast strategies and programmes to carry the thrust for sustainable development in the Cook Islands into the 21st century.

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Programme profiles

Contents list of programme profiles

Note: All currency amounts are in Cook Islands dollars.

Programme profile ***1.1.2***

Review of Island Council by-laws

Discussions with Island Councillors revealed that in some instances there was a lack of by-laws, while in others there was a lack of detailed knowledge by the Councillors about by-laws currently in force. Indeed, when investigating environmental concerns raised by Council members and people of an island, the Conservation Service frequently found those concerns were already addressed by existing by-laws of the Island Council. The Conservation Service also found that some Island Councils were less active than expected, and attributed this to a variety of reasons including lack of funding, a centralised national bureaucracy, and low morale. If environmental programmes are to be implemented successfully on the Outer Islands, it is imperative that Island Councils become effective and efficient instruments for programme delivery.

Aim and scope

This programme would entail:

a) a compilation of existing by-laws for each Island Council;

b) examination of those by-laws with Island Councillors, and their revision to ensure that they conform to a set of minimum, national environmental standards;

c) the production of bound sets of island by-laws for permanent reference by Island Councils; and

d) the training of Councillors on the by-laws and on appropriate administrative procedures.

Description

A legal officer would be engaged locally to compile by-laws for each island, with the assistance of Government representatives, and subsequently prepare a report on the efficacy of island by-laws from the environmental perspective. The report would be discussed with each Island Council and Outer Islands Seminars convened expressly on environmental by-laws and their enforcement. The report would be revised in the light of those discussions and, where sought by individual Island Councils, recommendations prepared to amend or revoke existing by-laws, or propose new ones. The report, together with by-law amendments, would then be submitted to Cabinet for its approval.

Cost estimates	Consultant fees	25,000
	Equipment/facilities	10,000
	Training costs	10,000
	Outer Island seminars	45,000
	Publication costs for by-laws	50,000
	Total cost	*CI$* **140,000**

Executing agencies Crown Law Office together with the Cook Islands Conservation Service.

Potential benefits Improved, environmentally relevant by-laws on the Outer Islands and greatly improved knowledge, application and enforcement of the by-laws by Councillors.

Potential issues The language of the by-laws must be plain and simple; they will need to be published both in straightforward English and in Cook Islands Maori. The training programme for members of Island Councils may be constrained by varying educational levels, and a special educational package will need to be prepared, including audio-visual material.

Processing/timing FY 1993

Programme profile ***1.3.1***

Development of EIA guidelines and minimum standards for National Government & Island Councils

Aim and scope

To develop a set of comprehensive Environmental Impact Assessment (EIA) guidelines and standards acceptable for use by both national and local government, together with detailed administrative procedures for applying the EIA guidelines. There would be two phases:

Phase 1

A national umbrella activity, under the guidance of the Task Force on Environment and Development, to set:

a) guidelines for i) when EIA is needed and how EIA should be carried out; ii) the management of endangered species; iii) the management of cultural and historic sites; iv) the mining of seabed mineral resources outside the 12-mile limit; and

b) minimum environmental standards for water and air quality, noise control and waste management.

Phase 2

With national umbrella guidelines and minimum standards established under Phase 1, in the second phase Island Councils would be assisted to set specific environmental guidelines for resource uses/activities for each island (as applicable) for: earth-moving; agriculture; forestry; watershed management; mining and quarrying of sand and aggregate; natural habitat and wildlife protection; and coastal/marine resources management.

The guidelines developed for each island should be compatible with and not diminish the established national guidelines. Each Island Council would be free to set more stringent environmental standards.

Description

An EIA Specialist would be engaged for six months to assist with review and revision of all existing EIA guidelines and minimum environmental standards in a consultative process between national and local government, and with non-governmental and business organisations. Guidelines would be established for the application of the EIA process to all government policies, to public and private sector development proposals and to the preparation of development assistance proposals, in accordance with the perceived level of potential environmental impact. Practical administrative procedures for EIA would be established.

The EIA Specialist would be supported by a local EIA Officer Counterpart. On completion of the EIA Specialist's task, the Counterpart would continue to refine the EIA administrative process and train government staff and Island Council members.

Cost estimates

EIA Specialist—*6 months*	40,000
Local EIA Officer counterpart—	
6 months plus 18 months local salary support	45,000
External travel and per diem	10,000
Internal travel for consultative purposes	10,000
Publication and dissemination of EIA guidelines and administrative procedures	5,000
EIA training	30,000
Total cost	*CI$* **140,000**

Executing agency Cook Islands Conservation Service would act as the executing agency for the Task Force on Environment and Development. The EIA specialist would be responsible to the Director of the Conservation Service for day-to-day administration.

Potential issues The limited development of administrative procedures may constrain the development and testing of EIA administrative procedures, including the monitoring and review of projects operating under an approved Environmental Impact Statement.

Processing/timing FY 1993 – FY 1994

Programme profile ***1.4.1***

Environmental resource accounting

The principles of resource pricing and accounting were highlighted as a tool for sustainable development by both the Cook Islands UNCED Report and by the Cook Islands State of the Environment Report. They have been widely discussed within some circles of the Cook Islands Public Service as a possible means of cost recovery for the loss or depletion of natural resources as a result of infrastructure development.

The concept of resource accounting is receiving close attention globally by environmental planners and those who espouse the sustainable development principle. *Caring for the Earth* states that "...the standard measures of economic performance and national income are dangerously misleading. They take no account of the depreciation or depletion of natural assets or of the social costs of pollution. They count expenditures to counteract environmental damage as income rather than costs". The calculation of true sustainable income of a nation must include costs of environmental damage and resource depletion. The current problem lies in placing monetary values on certain natural assets so that they can be compared with values resulting from market transactions (IUCN/UNEP/WWF, 1991, pp. 72, 74).

Aim and scope

This programme would:

a) investigate the development of an appropriate mechanism for environmental and resource accounting for the Cook Islands;

b) establish a database of current base values for those resources of greatest importance to the people, or relative weighting to be applied to asset depletion; and

c) institute training in resource accounting for senior and middle management.

Description

An environmental economist with resource accounting research experience would be engaged to work with a local counterpart economist over a three-month period. They would examine the development of resource accounting mechanisms appropriate for the Cook Islands, and attempt to institute a database of values on natural resource assets. They would subsequently run a management seminar where middle and senior level management would receive greater exposure to the concept, and an open debate could be held on the concept's application to the Cook Islands. The seminar would make recommendations to Cabinet.

Cost estimates	Environmental Resource Economist consultant	30,000
	Local Economist consultant	10,000
	Seminar—	
	material, equipment, organisation,	
	including travel allowance for delegates	20,000
	Outer Islands travel for local consultant	10,000
	Total cost	*CI$* **70,000**

Executing agency Ministry of Finance in consultation with the Statistics Department and the Cook Islands Conservation Service.

Potential issues The application of the concept and use of agreed values on natural resource assets in the decision-making process will require strong political support. Politicians should be encouraged to attend the proposed Seminar.

Processing/timing FY 1993

Programme profile **2.1.1**

Environmental awareness training

Public awareness of conservation values should be increased not only through passive educational campaigns, but also through the active involvement of government and non-governmental groups alike in true conservation action (that is, the wise use of resources). Such groups must be encouraged to become environmentally responsible. Perhaps the first step along the road to environmental responsibility is to try to motivate government staff and community groups to consider the environmental consequences of the decisions they make in their jobs, and the environmental consequences of their own life-styles. Through their good example, the principles of sound environmental management will flow on to those in private industry and to the public at large.

Community groups

Non-governmental organisations represent a cross-section of the community, be it churches, women's organisations, or specific interest groups. Such NGOs often have a flexibility and motivation which is lacking within a government bureaucracy. As a result, NGOs are generally a good target for environmental awareness campaigns. Where campaigns are directed through such NGOs, responsibility for the environment is placed directly in the hands of the community. There is an important role here for the CICS to organise environmental awareness training activities for key members of NGOs, encouraging them to carry the information into the community.

Government staff

Officers of government departments and agencies are constantly required to make administrative decisions on the implementation of approved government policies. Many such decisions have a short or long-term impact on the environment. While many officers have a specialised professional or technical background, few have received training in environmental science, and their decisions will reflect a lack of understanding of the environment. Special in-service training programmes are required on environmental principles, the fragility of the Cook Islands environment, and appropriate environmental management practices. These programmes would need to be structured to increase not only an officer's knowledge of the environment, but also to enhance his/her enthusiasm to take action on environmental issues.

Politicians, Island Council members and Aronga Mana

These people are "end of the line" decision makers. If they are not supplied with accurate, useful information, they cannot be expected to make informed decisions. Politicians have full schedules and find it difficult to make the time to attend special seminars on environmental issues. Nevertheless, they should be encouraged to attend any environmental seminars conducted for government staff or community groups. Island Council members and Aronga Mana must also be involved in environmental seminars, and consulted on environmental issues concerning their land.

Aim and scope

This programme aims to:

a) train selected members of community groups on particular issues of environmental importance and encourage them to take these issues back into their community groups and train others;

b) train government staff responsible for resource planning and management in sound environmental principles and practices through special seminars and workshops;

c) encourage politicians and Island Council members to attend such training sessions;

d) keep politicians, Island Councils and Aronga Mana informed of developments which could impact on their land or electorate; and

e) encourage politicians and Council members to seek ways in which economic development can be pursued in an environmentally appropriate manner.

Description

The environmental awareness training funded under this programme would be conducted on a "train-the-trainers basis". The first step would be for training specialists to train Cook Islands Conservation Service staff on the motivating of community groups, training procedures, the skilled presentation of information, and the conduct of effective seminars. CICS staff would then implement training programmes and seminars with NGOs, government staff and Island Councils. The programme would run for three years, with an appraisal of the effectiveness of the public awareness campaign after one year and a full evaluation by public survey techniques near its conclusion.

Cost estimates

Training specialist input (4 weeks in total) for training programmes:	
– *on the art of training others*	10,000
– *on communication skills and the conduct of seminars and workshops*	10,000
Consultations on design of CICS training courses and seminar delivery on Rarotonga and the Outer Islands	10,000
Community-based training on specific environmental issues— *including lagoon health, erosion, waste management, tourism (over three years)*:	
– on Rarotonga, *$25,000 per year*	75,000
– on Outer Islands, *$35,000 per year*	105,000
Environmental training of government staff and Island Council members— *3 years, $20,000 per year, including travel costs on the Outer Islands*	60,000
Training equipment and material	20,000
Public surveys and evaluation of environmental awareness programme effectiveness	10,000
Total cost	*CI$* **300,000**

Executing agency Cook Islands Conservation Service in consultation with government departments, Island Councils and community groups.

Potential benefits Increased environmental responsibility and awareness at all levels of the community.

Potential issues Additional Conservation Service staff are needed to conduct training seminars and workshops. These staffing needs are met within the context of required staffing for other proposed NEMS programmes.

Processing/timing FY 1994 – FY 1996

Programme profile **2.1.2**

Environmental youth programme

Environmental messages are better communicated within the community in a participatory, enjoyable way. They are also more interesting and better remembered if the community can directly relate to the message. With students or youth groups from each island involved in community performances of dance, song and plays, a greater enthusiasm will be generated for the message by all those watching and participating.

Aim and scope

This programme aims to increase environmental awareness by supporting students and youth groups on each island to develop their own environmental messages, through plays, dances and songs with environmental themes.

Description

A person would be engaged on contract, initially for one year, to liaise with schools and youth groups on Rarotonga and the Outer Islands to develop plays and dances with environmental themes. The person would work closely with the Ministry of Youth and Sports to help students develop their own ideas, relevant to their village or island. The production and public performance of plays and dances by the students and youth groups would be encouraged, with the expected support of teachers and youth workers.

Cost estimates

The programme would run for one year initially, when its performance would be evaluated. If proven successful, continued funding for its support should be sought.

Local Environmental Youth Programme Coordinator (EYPC) salary	20,000
EYPC travel costs to Outer Islands	23,000
Minor resource materials	2,000
Total cost	***CI$* 45,000**

Executing agencies

Cook Islands Conservation Service in consultation with the Ministry of Youth and Sport.

Potential benefits

An effective way of teaching the public about local, regional and global environmental concerns.

Potential issues

The programme should link with annual national traditional dance competitions. The full support of schools, Aronga Mana and church groups should be sought for this initiative.

Processing/timing

FY 1993

Programme profile **2.1.3**

Environmental education in school curricula

It is the children who will inherit the environmental consequences of any resource misuse today and of failure to conserve natural resources. Had their parents received appropriate environmental education, the children's inheritance would have been all that much the richer. To ensure that the mistakes of the parents are not passed on to their children, a comprehensive education programme at schools on environmental principles and safe resource use practices is essential.

Aim and scope

The programme aims to raise the level of environmental education and awareness of school children, and through them the environmental awareness of their parents. The programme would:

a) reappraise the education review *The Polynesian Way* from the environmental perspective;

b) develop appropriate environmental content for the curricula for primary and secondary schools; and

c) train teachers on use of the environmental curricula.

Description

This programme would involve two components.

Phase 1 The preparation of specific environmental curricula for primary and secondary schools which would reflect the unique environmental issues and circumstances in the Cook Islands. This component will also involve development of specific teaching materials.

Phase 2 Training of teachers on the use of the environmental curricula and the teaching materials.

The programme would be implemented within a a two-year period; teacher training would commence not later than 18 months after programme commencement.

Cost estimates

Local Environmental Education Curriculum consultant—*2 years*	60,000	
Preparation of teaching materials *including printing and distribution*		45,000
Travel support costs for teacher training		20,000
Environment workshops for teachers		15,000
Total cost		***CI$* 140,000**

Executing agency	Ministry of Education in consultation with the Cook Islands Conservation Service.
Potential benefits	a) Improved community understanding of environmental issues. b) Increased level of understanding about environmental issues amongst school children. c) Increased ability of school teachers to teach environmental issues.
Potential issues	Nil.
Processing/timing	FY 1993 – FY 1994

Programme Profile ***2.1.4***

Environmental Information Officer

The amount of accurate and relevant environmental information available to both the government and community is limited. There is a need for the development of more factual resource material in print, film, audio and display. This need can be met only through the engagement and training of an officer dedicated full-time to the production and dissemination of environmental information.

Aim and scope

This programme aims to develop an in-house capacity to:

a) develop the resources of environmental information, such as environmental fact sheets, posters, visual aids etc., which reflect current environmental concerns in the Cook Islands;

b) oversee production of television and radio spots for high impact media coverage; and

c) provide up-to-date information to media outlets on environment and conservation issues.

Description

An Environmental Information Officer (EIO) would be contracted, initially for two years, to develop environmental material directly relevant to the local environment, whether for an Outer Island, government department, TV or radio audience. For the first six months of the contract period, the EIO would receive special training on the production, presentation and dissemination of environmental information; as part of that training the officer would be attached to the information group of an overseas government environmental organisation. The EIO would address those information needs given high priority by community groups, traditional leaders and government departments. The EIO would provide a regular flow of relevant information to all media outlets to ensure a high conservation profile is maintained.

Cost estimates

Staff and training	
Environmental Information Officer—*2-year contract*	40,000
EIO training including overseas attachment—*6 months*	50,000
Resource material and environmental information	
Materials and printing	50,000
Radio & TV spot production including air time	100,000
Internal travel	10,000
Total cost	*CI$* **250,000**

Executing agency Cook Islands Conservation Service in consultation with the Natural Heritage Project, Cook Islands TV, and other departments. Following training, the Environment Information Officer would be responsible for the operation of the Environment Resource Centre.

Potential benefits Effective delivery of environmental messages to the community. Increased awareness of conservation and the role of the Cook Islands Conservation Service.

Potential issues Nil.

Processing/timing FY 1993 – 1994

Programme profile **2.1.5**

Environment Resource Centre

It is often difficult in the Cook Islands to obtain accurate, relevant and up-to-date information on the environment. What information is available in the way of reports, text books, pamphlets, posters, photographic slides and videos is scattered over a number of locations and not cross-indexed for ready access. There is a need for all environmentally relevant material to be indexed, but particularly so the material now housed at the Conservation Service. It is a fundamental role also of the Service to acquire more environmentally relevant information, not only print, film and sound, but also preserved biological specimens, geological samples and the like.

The Cook Islands has need of a central point of contact for the supply of environmental information and material to the community and government. The Conservation Service is the logical focus for such resources.

Aim and scope

To establish the Cook Islands Conservation Service as the resource centre for environmental information for the community, schools and government.

Description

This programme would assist to establish an Environment Resource Centre (ERC) within the Conservation Service which would service the information needs of the community, schools and government departments. The programme would fund the recruitment and training of a librarian to operate the ERC. Training will include the engagement of a consultant librarian for a three-month period.

Cost estimates

Funding needs are estimated for a two-year programme in the first instance.

Environment Resource Centre Librarian—*15,000 per year*	30,000
Consultant librarian—*3 months*	15,000
Acquisition of environmental material for reference and display	50,000
Library equipment—*stands, cabinets, card drawers, tables, microfiche viewer etc*	20,000
ERC operational support—*2 years postage, freight, communications, packaging materials, etc*	25,000
Total cost	***CI$* 140,000**

Executing agency Cook Islands Conservation Service.

Potential benefits

a) Community access to environmental information and resources will be improved.

b) A central reference point will be particularly valuable for the conduct of Environmental Impact Assessments.

Potential issues The possible need for additional space within the Conservation Service office building would need close examination. A separate, but nearby location for the ERC could be considered.

Processing/timing FY 1994 – FY 1995

Programme profile ***2.1.6***

National Biennial Environment Conference

Care of the environment is the responsibility of all Cook Islanders. It is clear that any efforts to improve the level of environmental quality in the Cook Islands must involve all the main groups, particularly traditional leaders, government leaders, and churches.

Traditional leaders have overall responsibility for activities occurring on their land, and thus the future of the Cook Islands lies in their hands. Government leaders are responsible for the development and implementation of policies which influence environmental management. And the churches of all denominations can wield great influence on the environmental attitudes and actions of the community. Thus, there is much to be gained from these three main groups regularly reviewing the environmental concerns of the Cook Islands.

The 1992 NEMS Seminar on Rarotonga was the first national environmental workshop of its kind and proved quite successful. The development of NEMS and environmental programmes does not stop there, but is part of an ongoing process of appraisal, revision and renewal of commitment.

For such a *national* conference to be successful, full participation by representatives of traditional leaders and representatives from the Outer Islands is vital. This will involve considerable cost in travel and expenses for representatives and, as such, would probably be financially impractical to conduct more than once every two years. Costs to government would be minimised if the Conference could be tied to some other national cultural event requiring extensive Outer Island participation.

Aim and scope

This programme would aim to:

a) bring together traditional and elected leaders, and representatives of churches and government for a biennial conference on the sustainable management of the Cook Islands environment including review of environmental strategies and their implementation;

b) develop nationally acceptable guidelines for environmental management built on traditional concerns; and

c) identify ways in which church groups and other non-governmental and industry organisations can participate actively in the promotion of sound environmental objectives.

Description The conduct of this National Environment Conference is seen as a major undertaking, requiring considerable organisation for it to achieve its potential success. It is envisaged that the Conference would be preceded by a chain of mini-conferences on environmental concerns involving the House of Arikis, Koutu Nui, Island Councils, and church administrations. Delegates from those bodies to the National Environment Conference would then truly be representatives in the full sense of the word.

Cost estimates The cost of the first National Environment Conference only is estimated here. The decision on the frequency of future conferences and the initiation of action to secure funding should be an agenda item for the first conference.

Travel for Outer Islands participants— *living allowances, catering, materials etc.*	40,000
Travel for CICS officers to assist conduct of preceding Island environmental mini-conferences in preparation for Conference	5,000
Miscellaneous conference costs — *including hire of venue and servicing*	10,000
Publication and dissemination of conference findings	5,000
Total costs	***CI$* 60,000**

Executing agency Cook Islands Conservation Service.

Potential benefits

a) Improved communication on environmental concerns between the three main public and private sectors of the Cook Islands.

b) Greater awareness of environmental issues amongst key decision makers.

c) Greater prospect for acceptance of environmental programmes by traditional landowners.

Potential issues Nil.

Processing/timing FY 1994

Programme profile **2.2.1**

Upgraded documentation of traditional environmental knowledge & practices

There is a considerable body of knowledge relating to the environment of the Cook Islands. Much of this results from many hundreds of years of management practices developed to ensure survival and handed down from generation to generation. These practices include, among many others, fishing and planting techniques, healing practices, and canoe construction techniques. For each practice, the traditional management system ensured that the supply of resources was sustained—in essence, sustainable use.

But the old ways are dying in many areas, and the Cook Islands Conservation Service has undertaken the task of formal preservation of traditional knowledge and made a start by the appointment of a specialist in traditional medicine. This person has been collecting information and also uncommon plant material for establishment in a traditional plant arboretum on Rarotonga to ensure their preservation.

This commendable initiative needs to be reinforced by expanding the scope of documentation of traditional knowledge and, where appropriate, publishing it in Cook Islands Maori to make it readily available to the wider community. This is a very large task and beyond the scope of the Conservation Service as currently established.

Aim and scope

The programme would aim to ensure that traditional knowledge and management skills relating to the environment are not lost.

Description

This programme is seen initially as a two-year task to gather traditional information on:

a) plants, birds, animals, fish and other marine life;

b) the different traditional systems which have been developed on the various islands to utilise these natural resources; and

c) traditional methods of canoe construction, sailing and navigation.

Collected information would be collated, verified and prepared for publication in Cook Islands Maori. Some information would be translated into English for wider publication. The programme would complement the preservation of traditional medical knowledge by the CICS but would require, in the first instance, the recruitment of an additional CICS officer dedicated full-time to the task for a two-year contract period. This officer would need specialist training in interview and recording techniques, and in the organisation and critical appraisal of collected information.

Cost estimates

Staff position to be attached to CICS—*2 years*	50,000
Internal travel costs—*$15,000 per year*	30,000
Specialist training for the CICS staff position—*6 months*	30,000
Equipment and supplies—*including expansion and maintenance of a traditional medicine arboretum, $20,000 per year*	40,000
Translation and publication of traditional information	100,000
Total cost	*CI$* **250,000**

Executing agency Cook Islands Conservation Service, in consultation with the Ministry of Culture and the Natural Heritage Project.

Potential benefits a) Preservation of traditional culture.

b) Increased awareness amongst younger generations of their heritage.

Potential issues Nil.

Processing/timing FY 1994 – FY 1995

Programme Profile ***3.1.1***

Development of a Coastal Zone Management Plan for the Cook Islands

With the exception of the *makatea* islands, most of the population of the Cook Islands lives in the coastal zone. It is this zone which is most sensitive to environmental pressure from unplanned use of both land and sea resources. Environmental damage in the coastal zone is particularly marked on Rarotonga and Aitutaki, possibly as a consequence of the higher population pressure on those islands. There is a need for improved planning for the utilisation of the coastal resources, taking care to integrate economic development and environmental protection to ensure development is ecologically sustainable.

Aim and scope

This programme aims to improve the protection of the coastline of the Cook Islands against erosion and other degradation through the preparation of a Coastal Zone Management Plan. This Plan will include:

a) the identification of areas most at risk from coastal erosion and recommendation of appropriate responses;

b) the development of guidelines for the protection of coastal areas; and

c) the incorporation of local knowledge into the Plan's management practices.

Description

The Plan would be prepared by a Coastal Zone Management Officer seconded for 12 months to the Cook Islands Conservation Service. This specialist would be supported by existing CICS environmental management officers.

The Plan would cover the entire Cook Islands. However, there would be a different emphasis for Rarotonga and Aitutaki than for the other islands. The main emphasis for the Outer Islands would be on the improved design and location of wharfs, passages and channels. On Rarotonga and Aitutaki, the emphasis would be on developing a wide range of strategies to address the various causes of coastal erosion.

The Plan would address major issues, develop strategies, and indicate priority actions for implementing those strategies. Major issues include the use of artificial seawalls, and their design and placement; the construction of other engineering structures and physical infrastructure in the coastal zone, including the construction of dwellings, hotels/motels and business premises; clearing of woody vegetation which protects the shoreline; the mining of sand and aggregate for construction and roading purposes; and infilling coastal areas to create additional land for real estate purposes.

Among strategies to be considered would be the development of enforceable zoning laws and regulations to control land use for the greater good of the community; priorities and locations for the replanting of native shrub and tree species on the coast to address coastal erosion; specific controls to be developed for the removal of materials from the coastal zone, including provisions to be specified in leases for rehabilitation of sites on completion of such operations; and community education regarding the value of the coastal zone.

The Plan's development and implementation would be undertaken with the broadest possible public involvement, and particularly that of the traditional and elected community leaders. Local knowledge of currents and tidal patterns, and other traditional knowledge relevant to the land and sea resources of the coastal zone would be incorporated into the Plan.

Cost estimates

Coastal Zone Management Consultant—*12 months*	60,000
Travel costs, internal	15,000
Local meetings—*including travel costs for Outer Island participants*	35,000
Materials	10,000
Plan production	20,000
Total cost	***CI$* 140,000**

Executing agency

The Cook Islands Conservation Service would execute the programme under the guidance of the National Task Force on Environment and Development. The CICS would work closely with other relevant government agencies.

Potential benefits

a) Improved management and protection of the coastal zone.

b) Increased community support for measures to protect the coastal zone.

c) Clearer understanding of the role of the various agencies that are involved in coastal management.

Potential issues

This is a major issue in which it is vital for continued co-ordination between government agencies, traditional and elected leaders, and relevant private sector interests.

Processing/timing

FY 1994

Programme profile ***3.1.2***

Alternative sources of construction sand and aggregate on Rarotonga

Construction grade sand and aggregate are vital for Cook Islands development. Rarotonga is of basaltic origin and while there is a rock crushing plant on the island which can provide high quality aggregate and some fines, the volume produced is only a small fraction of that needed. To date, there has been no alternative to quarrying sand from beaches and inland deposits, and over the past 50 years considerable damage has been done to foreshore areas through this practice.

The alternatives are (1) to continue mining environmentally sensitive sand and gravel sources at an ever increasing rate to meet the infrastructural needs of a booming tourist industry and accept the inevitable resultant environmental damage; or (2) locate less sensitive alternative sources of material. This project examines one alternative source; detritus at the ocean outfalls in the fringing reef.

Aim and scope

This programme has two sequential aims:

a) to assess the economic and financial feasibility, and the *environmental* acceptability, of recapturing sand and gravel deposits from reef passage outfalls on Rarotonga, as a viable alternative to beach mining; and

b) if assessed positively, to conduct a trial recovery operation from selected reef outfalls to prove technical feasibility and verify predicted environmental consequences.

Description

The programme would field a team of a local coastal engineer, an economist, and an environmental specialist to advise on the technical, economic, financial, and environmental viability of recapturing sand and gravel of suitable construction grade from selected reef passages. This study would report on overall feasibility of the proposal and outline the steps required, together with detailed costings, to implement a pilot trial recovery project.

Cost estimates

Consultants fees	35,000
Study materials and report preparation	10,000
Total cost	*CI$* **45,000**

Executing agencies

Ministry of Works, in consultation with the Conservation Service.

Potential benefits Reduced pressure for removal of sand and aggregate from the Coastal Zone, and consequent reduction in erosion and marine sedimentation.

Potential issues The need for public education on the linkage between removal of sand and aggregate from the coast, and coastal erosion and marine sedimentation.

Processing/timing FY 1993

Programme profile **3.2.1**

Development of an environmental management & monitoring plan for Manihiki Lagoon

Pearl farming has considerable potential for assisting economic growth in the Northern Group of the Cook Islands. Experience elsewhere, however, has shown that the lagoon environment must be appropriately protected for the industry to be sustainable. The extent of lagoon pollution at Manihiki is increasing due to a number of factors including sewage and poor pearl farm management practices.

Aim and scope

To develop a plan of management which will protect the rapidly growing pearl-farming industry in the Manihiki lagoon, and thereby ensure the base for sustained economic development of the island.

Description

This programme will produce a plan of management and establish routine monitoring activity aimed at protecting pearl farming on Manihiki, thus contributing to the sustained development of the Cook Islands pearl industry and of Manihiki itself. This programme would comprise two phases:

Phase 1

Would entail the conduct of a baseline survey of the current situation in the lagoon, including sources and levels of pollution; extensive consultation with land owners; identification of specific actions to be undertaken in the lagoon; and the training of personnel through a series of workshops conducted by local experts on pearl-farming practices together with CICS staff.

A senior environment management specialist would be hired for twelve months to lead this phase, assisted by two Environment Officers recruited by the CICS and outposted to Manihiki.

Phase 2

Would see the implementation of a continuing monitoring programme by the Environment Officers, as a co-operative exercise between the Cook Islands Conservation Service and the Manihiki Island Council.

Cost estimates *(for a 3-year period)*

Environment management specialist to conduct base line survey and prepare environment management plan—*12 months, including recruitment cost, travel, administrative overheads*	140,000
2 Environment Officers for Manihiki (Tukao and Tahunu)—*3 years, $14,000 per year*	84,000
Conduct of base line survey—*special equipment, boat hire, sample analysis*	10,000
Training workshops, island consultations on draft plan	40,000
Printing of island-approved management plan	6,000
Capital costs—*including construction of house and office accommodation, purchase of 2 dinghies and outboard motors*	100,000
Monitoring operational costs for CICS outstation on Manihiki—*3-year period ($40,000 per year) including routine sampling, and analysis*	120,000
Total cost	*CI$* **500,000**

It is anticipated that by the end of the third year of the programme, the Cook Islands Government will have established a system by which the pearl-farming industry itself will fund ongoing costs for monitoring lagoon pollution and other environmental factors to ensure the industry's future.

Executing agencies Cook Islands Conservation Service, in close co-ordination with the Manihiki Island Council and the Ministry of Marine Resources. The Environment Officers would be members of the CICS, outposted to Manihiki, and under the control of the Council for day-to-day administration and discipline.

Potential benefits

a) Lowered level of lagoon pollution and hence protection of the pearl-farming industry.

b) An insurance policy, at a very small proportion of the potential value of the industry.

Potential issues

There is a need for public education on the linkage between waste disposal, lagoon pollution and the sustainability of the pearl industry. This study would provide such training. The information obtained from the programme would be valuable for the future establishment of a pearl-farming industry in other Northern Group Islands.

Processing/timing

The Asian Development Bank has advertised a Technical Assistance Advisory Project to be piggybacked to the Pearl Culture Loan for a three-year period to a value of US$ 552,000 (approximately CI$ 1 million). This is for the hire of the services of an Ecosystem Management Specialist. The programme is seen as operating from FY 1993 – FY 1995 in the first instance. The monitoring programme would be ongoing.

Programme profile **3.2.2**

Development of policies & procedures to minimise overfishing of reefs and lagoons

There are a number of threats to the inshore fishing resource in the Cook Islands. These include netting of lagoons and use of nets with small-sized mesh; destructive fishing practices, including the use of poisons and dynamite; and uncontrolled use of SCUBA for fishing.

Aim and scope

To develop policies and management procedures which would minimise overfishing of inshore marine resources.

Description

This programme would involve the development of a comprehensive set of policies and procedures to address bad fishing practices. The task is complex, involving data collection on the problems of declining fish stock, and close consultation with traditional leaders and landowners. The programme would require a two-year secondment to the Ministry of Marine Resources of a marine resources specialist with expertise in the assessment of fish stocks. It would be an advantage if the specialist had experience in conducting attitudinal surveys. This secondee would be supported by a Cook Islands Maori-speaking counterpart who is familiar with Cook Islands customs and practices. Complementing this programme would be a major community education programme.

Cost estimates

Secondment of Marine Environmental Resources specialist to Ministry of Marine Resources—2 *years*	120,000
Marine Environmental Resources Officer counterpart (Cook Is Maori-speaking)—2 *years*	42,000
Travel costs and administrative overheads	16,000
Island consultations and community education	52,000
Total cost	***CI$* 230,000**

Executing agencies

Ministry of Marine Resources, in consultation with the Cook Islands Conservation Service.

Potential benefits

Reduced level of overfishing of inshore marine resources.

Potential issues

A community education programme would be required in conjunction with this programme. This would be part of the more broadly scoped environmental public awareness programme instituted under the NEMS by the Cook Islands Conservation Service, in consultation with the resource-user departments.

Processing/timing

FY 1993 – FY 1994

Programme profile ***3.3.1***

Development of soil management guidelines

Soil erosion is a major problem in some areas of the Cook Islands. In a number of cases this erosion resulted from poor road design and construction; the lack of controls on building construction, especially on steep slopes; other poor drainage practices; and lack of site rehabilitation in relation to development activity. By far the greatest cause of accelerated erosion, however, has been the injudicious use of fire to control vegetation on upper slopes and unstable soils types, and intensive forms of agriculture on steep slopes without due regard for the disposal of surface runoff and the minimising of erosion.

Aim and scope

To develop guidelines for land use management applicable to the Cook Islands and acceptable to Cook Islanders which will lead to a reduction in accelerated soil erosion.

Description

A soil conservation specialist would be engaged for a total period of six months to develop soil conservation guidelines for construction and other land development activities likely to contribute to soil erosion, and a system for their administration. The specialist's time would be split over a period of 12 months, during which he would be supported in-country by a Cook Islands Maori-speaker with agriculture/soil erosion training.

The soil conservation guidelines would cover such areas as: restriction of activities for specified types of unstable soils; slope restrictions for activities likely to result in significant soil disturbance; construction and drainage of roads; rehabilitation of disturbed areas; protection of natural watercourses, especially for leased properties; control of burning of fernlands and on steep slopes; and construction of soil control structures.

Cost estimates

Soil conservation specialist—*6 months*	50,000
Staff position in the Ministry of Agriculture—*1 year*	25,000
Travel and administrative costs	15,000
Consultation/meetings costs	10,000
Total cost	***CI$* $100,000**

Executing agencies Ministry of Agriculture, in consultation with the Ministry of Works and the Cook Islands Conservation Service.

Potential benefits

a) Decreased soil erosion.

b) Improved land management.

c) Decreased siltation.

Potential issues This programme will require extensive consultation with landowners on agricultural practices and planned use of fire; and with the Public Works department on road construction and site development practices.

Processing/timing FY 1993

Programme profile **3.3.2**

Reforestation of grassland & eroded areas

The Forestry Division of the Ministry of Agriculture initiated reforestation programmes in 1986 on Mangaia, Atiu and Rarotonga and, more recently, on Mauke, with the major objective of helping to rehabilitate areas suffering from severe soil erosion. Over the past four years, 456 ha of fernland (the area formerly considered most at risk of erosion) has been planted, mostly on Mangaia and Atiu, representing about 25 per cent of the area of this vegetation type. There are also badly eroding former pineapple production areas on those islands which require urgent soil conservation attention. These would be one of the main targets of a pending major soil conservation programme funded by the FAO.

The rate of reforestation activity will be increased, the emphasis changing to the commercial production of plantation pine *(Pinus caribaea var. hondurensis)* for local supply, while still performing a useful conservation function. However, there is a practical limit to the rate of reforestation activity because of the limited available labour on the Outer Islands for plantation establishment and, in particular, for maintenance during the early plantation establishment years. This maintenance includes fire control which is a major threat in the former fernland areas.

Aim and scope

The aim is to expand the existing rate of reforestation on areas of the Cook Islands suffering from, or subject to, accelerated soil erosion.

Description

The Forestry Division has the staff and the capability to undertake a limited increase in the rate of plantation establishment. Any further acceleration would require the introduction of special forestry labour arrangements. This programme proposes additional funding to increase the existing rate of reforestation in catchment areas of Mauke and Rarotonga.

Cost estimates

Funding of $100,000 over two financial years to support additional forest establishment on Mauke and Rarotonga and improved capability in protection from fire.

Executing agency

Forestry Division of the Ministry of Agriculture.

Potential benefits

a) Reduced erosion and sedimentation from catchment areas.

b) Aesthetic improvement of degraded land.

c) Local employment.

Potential issues This programme should be closely linked with the development of the soil conservation guidelines, the New Zealand Overseas Development Administration reforestation programme support, and the pending FAO Soil Conservation Service programme.

Processing/timing FY 1993 – FY 1994

Programme profile ***3.4.1***

Development of tourism-based conservation areas

The development of protected areas, aimed at enhancing the tourist potential of Rarotonga and the Outer Islands, was a key feature of the Tourism Master Plan.

Aim and scope

This programme would aim:

a) to investigate the possibility of establishing conservation areas on Atiu, Mangaia, and Penrhyn; and

b) to assist with the development of conservation areas which have the support of Island Councils.

Description

This programme will investigate specific proposals arising from the Tourism Master Plan, with the objective of establishing a number of conservation areas in the Cook Islands, where these are supported by the Island Councils. Conservation area investigations would involve intensive consultations with Island Councils and with traditional leaders and landowners of the areas under consideration. Management plans would be developed for agreed areas and these implemented through Island Councils with landowners retaining overall management control.

Cost estimates

Baseline surveys	20,000
Consultants	20,000
Consultative meetings	10,000
Total cost	***CI$* 50,000**

Executing agency

Cook Islands Conservation Service.

Potential benefits

1) Increased financial returns to the Outer Islands and the nation as a whole from tourist revenue.

2) Improved protection of fauna and flora.

Potential issues

This success of this programme will hinge on the consultative process with traditional leaders and landowners.

Processing/timing

FY 1993.

Programme profile ***3.4.2***

Application of traditional knowledge to resource conservation practices

Aim and scope

The aim of this programme is to ensure that:

a) traditional knowledge regarding the conservation of natural resources is documented;

b) traditional knowledge is applied to contemporary resource management practices in the Cook Islands; and, specifically,

c) traditional medicinal plants and the knowledge of their usage is preserved.

Description

Traditional practices have greatly contributed to the conservation of natural resources. But, as with many Pacific countries, there is a danger that this traditional knowledge will be lost with coming generations, as increasing emphasis is placed on the cash economy and non-traditional behaviour and values. This programme would comprise three projects.

Project 1 Documentation of traditional resource conservation practices and evaluation of how they could most usefully be applied to contemporary resource conservation practices.

Project 2 An inventory of traditional medicinal plants used in Cook Island communities, identifying and mapping sites of medicinally important plants. Botanical samples would be collected for identification and possible analyses for active agents. Tape-recordings and visual records would be made during the field survey of their traditional medicinal usage.

Project 3 Continuing the establishment on Rarotonga of a herb garden/arboretum of the rarer or endangered plants used for medicinal or other customary usage.

These three projects would be implemented over a two-year period, under the direction of the Traditional Specialist currently employed by the Cook Islands Conservation Service, with the assistance of a second Cook Islander to be contracted by the CICS for this work.

Cost estimates	Engagement of traditional studies research advisers—*including travel to Cook Islands and internal travel, 3 months in total*	60,000
	Staff support position to be attached to the Conservation Service—*2 years, $15,000 per year*	30,000
	Equipment—*audio and visual recording equipment etc.*	10,000
	Travel costs, internal	20,000
	Total cost	*CI$* **120,000**
Executing agencies	Cook Islands Conservation Service in consultation with the Ministry of Culture.	
Potential benefits	The preservation in the community of traditional knowledge which is rapidly being lost.	
Potential issues	Nil.	
Processing/timing	FY 1993 – FY 1994	

Programme profile ***4.1.1***

Rarotonga waste disposal management

The disposal of human waste and other organic and inorganic wastes is a growing problem for Rarotonga and poses environmental hazards which, if not addressed, could have serious consequences for public health and threaten tourism development.

Individual households currently use septic tank systems; most are improperly installed and current methods of effluent disposal are grossly inefficient. Collected sludge from septic tanks is spread on plantations and vacant land also posing risks for human health. With the growth in commercial and industrial activity on Rarotonga, more housing, commercial premises, tourist resorts and other facilities are being built on the coastal strip of Rarotonga, overtaxing septic tank capacity. There is also concern for pollution of fresh water and the lagoons through percolation and lateral flow of liquid waste into the water table.

There is a difficulty in securing adequate land area for the disposal of solid waste collected around the island; formerly productive taro swamps are being used as landfills and this loss of productivity cannot be sustained. The Cook Islands Government is looking into alternative systems of refuse disposal which require minimal use of land.

Aim and scope

This programme would aim to:

a) design and construct a sewerage system for Rarotonga; and

b) develop an effective system for refuse collection, disposal and management on Rarotonga.

Description

The programme would have two phases:

Phase 1 — A detailed feasibility study, including engineering and environmental studies, and system design (one year).

Phase 2 — Actual system construction, commissioning and associated training (over a three-year period).

Cost estimates

Phase 1 Feasibility study: investigation, survey, design, and detailed planning for implementation of a solid waste system and a sewage disposal system, including detailed costings, economic and financial appraisal, and Environmental Impact Assessment:

External costs	200,000
Local costs	50,000
Phase 1 costs	*CI$* **250,000**

Phase 2 Preliminary cost is estimated roughly at CI$ 12 million, or about US$ 6.36 million, for (i) a solid waste disposal system, including lined landfill, with compactors and incinerators (ii) sewerage system. Note that the development of detailed costs for Phase 2 is an output of the Phase 1 feasibility study.

Total costs	*CI$* **12,250,000**

Note: Only the Phase 1 costs are included in NEMS estimates.

Executing agency Proposed establishment of a Waste Management Authority. This Authority would liaise closely with the Ministry of Works and other agencies.

Potential benefits

a) Improved public health.

b) Reduction in water and visual pollution.

c) Protection of the tourist industry.

Processing/timing Phase 1: FY 1994.

Phase 2: System construction and commissioning would then proceed over the period FY 1995 – FY 1997.

Programme Profile ***4.1.2*** **Outer Islands solid waste disposal programme**

Aim and scope

This programme is aimed at:

a) the initiation of a garbage collection service under the control of Island Councils;

b) training in the proper management of a rubbish dump;

c) householder education on the separation of non-biodegradable rubbish from other household refuse; and

d) householder training in effective composting techniques.

Description

This programme would fund, over three years, the design and implementation of a system which would remove non-biodegradable rubbish from the village environment and promote householder composting of organic waste for use in food gardens. The programme would fund the purchase for each island of a small tractor and purpose-built trailer for the collection of solid waste; the provision of two drums per household for sorting organic and inorganic wastes; and the construction of a community composting facility.

Cost estimates

Cost per island

Equipment purchase—*tractor, trailer, scraper blade, garbage drums with lids, composting boxes and equipment*	45,000
Annual costs for garbage collection, and dump management—*3 years, $5,000 per year*	15,000
Local training costs and household education campaign on composting for vegetable production	10,000
Annual monitoring of progress by CICS and DPH	5,000
Cost per island	**75,000**
Total cost for 8 islands	***CI$* 600,000**

Executing agencies

Island Councils.

Potential benefits

Improved health and living conditions, and enhanced aesthetic appearance of the atoll.

Potential issues

Nil.

Processing/timing

FY 1994 – FY 1996

Programme profile ***4.1.3***

Outer Islands sanitation demonstration programme

A major problem on all atolls is the disposal of human wastes. Traditionally, the lagoon or beach was used as the toilet, but this is today unacceptable in a rapidly growing population which relies heavily on its marine resources. There has been a campaign to introduce flush toilets but these are less than satisfactory on atolls because they are wasteful of scarce water resources, and percolation through porous soil can readily carry contamination into the lagoon.

There are now a number of hygienic, self-contained toilet units (commonly called bio-toilets) available on the market which are of reasonable cost and do not contribute to pollution. The compost by-product from these toilets makes an excellent garden fertiliser and improves soil structure and moisture holding capacity. They would seem well suited to the atoll environment, and merit practical trial.

Aim and scope

This programme would aim to create in the communities of Outer Islands which depend mainly on rainwater supply, an awareness of the hygiene and other advantages of modern sanitation systems suited to the atoll environment.

Description

This programme would fund, over two years:

a) the recruitment by the Public Health Department of an Environmental Health Officer to head a 2-year bio-toilet test project, involving the schools of Penrhyn, Rakahanga and Manihiki; (i) to train teachers and students on their use, and (ii) to provide information on bio-toilet use to the public; and

b) the purchase and installation of bio-toilets.

If evaluated positively, the programme should be extended to provide such toilets to all schools in the Northern Group.

Cost estimates

Staff position of Environmental Health Officer— *2 years*	30,000
Training (external) of officer on use of bio-toilets, compost handling, maintenance	10,000
Selection and purchase of trial bio-toilets	50,000
Internal travel and operational costs	10,000
Total cost	*CI$* **100,000**

Executing agencies Public Health Department together with the Education Department. The Environmental Health Officer would be out-posted to Manihiki.

Potential benefits

a) Reduced pollution of beaches and lagoons.

b) Conservation of water.

c) Benefits of supply of composted fertiliser for improved vegetable and fruit production on the atolls.

If the school demonstrations prove satisfactory, there will be an increasing demand for the supply of these toilets to homes; this could lead to support by the Cook Islands Government of local manufacture by the private sector.

Potential issues The compost from these toilets has been proven by health authorities to be quite safe for the production of food for human consumption. Nevertheless, there may be an initial reluctance to use the composted manure on household gardens.

Processing/timing FY 1994 – FY 1995

Programme profile ***4.1.4***

Water quality monitoring programme on Rarotonga & Aitutaki

The lagoons of Rarotonga and Aitutaki with their blue water and white beaches are an archetype for Pacific tourism. The lagoons also provide fish and other marine resources, and recreation for local people. However, increasing tourism has resulted in sewage problems developing, and there is currently no system for routine monitoring of the effect of coastal developments on water quality, nor on the possible pollution of the lagoons by fertilisers and biocides. There may be no significant problem at all. But the extent, severity, and rate of pollution of marine and fresh water remain conjecture until a full survey of water quality is made in both lagoons and streams, and comprehensive, reliable baseline data thereby established for future comparison.

Cook Islands has the laboratory capability to undertake regular analyses of water samples and also has a special arrangement for analysis with New Zealand laboratories. However, no routine water quality sampling and analysis programme is currently in place.

Aim and scope

The proposed programme would:

a) establish a comprehensive set of baseline data on water quality for selected areas of Rarotonga and Aitutaki; and

b) devise and institute a routine water quality monitoring programme.

Description

A specialist on water quality sampling and analysis would be engaged for a total of 12 months to:

a) select suitable water monitoring sites;

b) review staff training in water sampling and basic laboratory analyses;

c) institute necessary training of field and laboratory staff;

d) examine the utility of the sample analysis arrangements with New Zealand laboratories;

e) review with the Public Health Department existing quality standards and set standards appropriate for the Cook Islands; and

f) train a counterpart manager to continue the sampling programme.

It is proposed that the specialist adviser/trainer's 12-month engagement be divided into two periods: an initial 6-month secondment to the Cook Islands to work in-country, followed by 6 one-month visits over a further 30-month period in order to provide overall programme supervision and

advice. The adviser would be expected to provide on-call advice over the period of the arrangement. A counterpart would be recruited under the programme for a 3-year period, to be trained in both technical and managerial aspects of a national water quality monitoring programme.

Cost estimates

Water Quality Monitoring Specialist adviser and trainer—*12 months in total*	70,000
Cook Islands Water Quality Monitoring Coordinator counterpart—*3 years*	60,000
Training costs for:	
Cooks Islands staff	6,000
External training for counterpart programme manager—*3-month attachment*	4,000
Travel costs:	
Specialist's travel costs over 3 years	20,000
Counterpart's external travel	3,000
Internal travel	12,000
Equipment and materials, freight	50,000
Total cost	*CI$* **225,000**

Executing agencies Public Health Department in consultation with the Cook Islands Conservation Service.

Potential benefits Protection of public health and safeguarding of the tourist reputation of Rarotonga and Aitutaki.

Potential issues The water sample network established on Rarotonga should also include stream sampling sites above areas of human disturbance to establish natural baseline levels of sediment and base chemicals. A simple network of water sampling points for suspended sediment can be used to pinpoint the main sources of catchment erosion.

Processing/timing FY 1994– FY 1996

Programme profile ***4.2.1***

Atoll water catchment & storage programme

On the atolls there is an ever present risk of pollution of shallow groundwater wells. The only safe, affordable source of potable water is stored rainwater, although pollution will still occur if storage tanks are poorly maintained. Current household water storage capacity is inadequate to tide the average family over an extended three-month period of dry weather, a not uncommon occurrence in the Northern Group atolls. The Cook Islands Government's current household and community water tanks programme would continue to be extended to all islands of the Northern Group, but with priority given to Pukapuka and Nassau.

Aim and scope

The proposed programme would:

a) promote an increase in water catchment storage by each household to 9.000 L (2000 gall);

b) foster local private industry in the construction of fibreglass water tanks and cisterns; and

c) encourage proper maintenance of the systems.

Description

The programme would assist the Government to expand its existing programme of water storage development through three linked activities:

a) Establishing a line of credit through the Cook Islands Development Bank for lending to residents of the Northern Group atolls for construction or upgrading of household water storage facilities.

b) Fostering, through technical advice and subsidised loans to the private sector, the local manufacture of affordable, portable, stackable, fibreglass storage tanks to a self-flushing design. Design advice may need to be sought from a rainwater storage specialist.

c) Training private enterprise service companies to install and maintain rainwater storage systems.

Cost estimates The estimates are designed to cover an initial one-off investment, plus support costs for a three-year period for loan servicing, industry support training and ancillary costs.

Establish line of credit, CIDB	1,000,000
Administrative costs of loan—*3 years, $30,000 per year*	90,000
Industry support package as subsidised loans	200,000
Training costs	60,000
Specialist design/technical advice	50,000
Total cost	***CI$* 1,400,000**

Executing agencies Ministry of Works, together with the Cook Islands Development Bank.

Potential benefits

a) Increased water storage and reduced health problems in drought periods.

b) Support of private industry in both manufacturing and service sectors, and on the Outer Islands.

Potential issues Argument of inequity in promoting the activity through loans and private industry rather than as previous direct government handouts.

Processing/timing Preparation of submission for loan for 1994 Country Programming Missions. Programme commencement in FY 1996.

Programme profile ***4.3.1***

Petrol/oil/lubricant (POL) emergency response

Although the possibility of a major oil spill may seem remote given the track record in the region, oil tankers do travel the region and accidents can occur. Environmental planning must take this possibility into account and consider the measures necessary to minimise the impacts on marine and coastal resources in the event of such a spill. An Oil Spill Contingency Plan has been prepared by South Pacific Regional Environment Programme and International Maritime Organisation for the Cook Islands Government. But there is a continued need for training and for acquiring oil spill response equipment.

Aim and scope The overall aim is to have the Cook Islands better prepared for a potential oil spill emergency.

Description The programme would entail:

a) conducting workshops in both Southern and Northern Groups on oil spill response involving personnel from relevant public and private agencies;

b) procurement of necessary equipment and development of other infrastructure which will facilitate an early response by the government to a major oil spill.

Cost estimates

Oil spill workshops	50,000
Response equipment, chemical	200,000
Total costs	***CI$* 250,000**

Executing agency Ministry of Works.

Potential benefits Better able to cope with emergency.

Potential issues Nil.

Processing/timing FY 1993

Programme profile ***4.4.1***

Environmental monitoring of hazardous chemicals

For many years on Rarotonga, citrus growers used large quantities of agricultural chemicals and fertilisers to improve yields and quality. The possibility of any linkage between coastal degradation and the chemical usage has not been assessed. On Aitutaki, the use and disposal of fungicides and pesticides in the banana industry caused concern, particularly where excess chemical was dumped into the harbour. Chemicals used to control mosquitoes, including DDT, can also pollute the food chain.

There have been no studies of the level of toxicity or persistence of agricultural chemicals in soils and plants at the production end of the food chain. Nor has there been monitoring of drugs, hormones and chemical residues in food to protect consumers from toxins. The Cook Islands has the laboratory capability to undertake some testing on a routine basis. Some tests requiring particularly sophisticated scientific apparatus may not be economically justifiable to undertake on Rarotonga but can, by existing arrangement, be undertaken in New Zealand.

Aim and scope

The programme would aim to institute a programme of regular basic monitoring of fish, shellfish, fruit, vegetables, root crops, and meat to assess the level of residues of organochlorines, organophosphates, heavy metals and chemicals.

Description

The programme would fund short-term technical assistance to assess the feasibility of establishing a monitoring programme using available laboratory facilities and supplemented by external analyses. The training needs and cost of any institutional and infrastructural upgrading would be carefully evaluated. The feasibility study would also advise on an appropriate trace-back system for residue levels found from analysis to be above safe limits.

Cost estimates

Technical assistance involving a team of external and public health laboratory experts—*1 month*	50,000
Total cost	*CI$* **50,000**

Executing agencies Ministry of Agriculture in consultation with Public Health Laboratory.

Potential benefits

a) Protection of public health.

b) Protection of overseas agricultural markets.

c) Safeguarding of the tourism industry.

Potential issues The conduct of this proposed feasibility study should be undertaken in conjunction with Programme 4.1.1 for establishing a water quality monitoring programme for Rarotonga and Aitutaki. Water samples would also be analysed for hazardous chemicals, and such analysis has similar requirements for laboratory analytical equipment, although sample preparation is different. The funding of recurrent costs for a routine monitoring programme for hazardous chemicals would be significant, but still remain small against the possible reduction in tourist numbers due to bad publicity in the case of inadvertent poisoning or other health effect.

Processing/timing FY 1993

Programme profile ***4.5.1***

Northern group solar electrification

The importation of fuels represents a major foreign exchange cost, with 30 per cent of imported fuels in 1984 being used for electricity generation. The Cook Islands Government policy is to reduce dependence on imported fuel through promotion and more efficient utilisation of natural sources of energy. In the Northern Group, diesel imported for electricity is particularly expensive because of freight on-costs. Also, in view of the isolation of these islands and limited shipping, it is desirable to reduce reliance on imported fuel to a minimum. Photovoltaic electrification of all 142 households on Pukapuka was undertaken in 1992 with French assistance. The Government seeks to install photovoltaic systems on Penrhyn, Manihiki, Rakahanga and Palmerston, and to upgrade an existing, similar, but old, system on Nassau.

Aim and scope

The programme aims are to secure:

a) reduced importation of fuel into the Cook Islands and retransport to the Northern Group;

b) progressive supplementation of diesel generation in the Northern Group with solar energy.

This programme would be specifically directed at the installation of photovoltaic electrification systems in Manihiki, Rakahanga and Palmerston.

Description

The programme would fund:

a) the design, supply and commissioning of photovoltaic electricity systems for a total of 140 households on Manihiki, Rakahanga and Palmerston;

b) the establishment of an inventory control system and initial stock of spare parts; and

c) the training of one local from each island on equipment maintenance.

Cost estimates

On the basis of real costs for the recent installation of photovoltaic systems on Pukapuka, the capital cost of equipment and installation is estimated at $15,000 per household for basic electric light and refrigeration. The total cost for 140 households would be *CI$* **2.1 million**.

Executing agency	Ministry of Energy.
Potential benefits	a) Raised standard of living, health and safety of the people living on these Outer Islands. b) Reduced out-migration pressure.
Potential issues	Continued subsidisation of households for system maintenance could become a significant recurrent expenditure burden for government.
Processing/timing	These solar systems have a high initial capital cost. Given the limited financial resources of people in the Northern Group, soft loan funding or grant-in-aid funding would be sought. Applications to be prepared in FY 1993 for submission to 1994 Country Programming Missions of appropriate donor agencies.

Cook Islands Government environmental policies

The Manifesto of the Cook Islands Party

The Cook Islands is fortunate that the ruling Cook Islands Party has developed a manifesto which incorporates a wide range of environmental policies. These constitute a sound base on which to erect a structure of environmental management strategies and programmes which will help steer Cook Islands to the overall goal of sustainable development.

The Manifesto includes the following specific policies for environmental control and conservation:

a) Establish an Office of the Environment and Conservation which shall be the implementing agent of the Council established by the Conservation Act for the prevention and control of serious environmental and ecological problems. This office shall be given sufficient authority, finance and staff to do an effective job in the enforcement of the environmental legislation and standards as well as initiating and supporting nationwide the education and promotion of good environmental and conservation practices.

b) Have Environmental Control and Conservation taught in schools and make it a subject in the Cook Islands School Certificate examinations.

c) Establish offices in the Outer Islands where appropriate.

d) Review the existing legislation with particular reference to the 50 metre mean-low-water-mark inland restriction as well as conduct a nationwide educational programme prior to enacting any changes.

e) Instigate a foreshore development programme which shall take into account the need to improve the area functionally and aesthetically and ensure as far as is possible adequate protection for all properties along the foreshore. In this connection urgent attention shall be given to the Avarua downtown area.

f) Seek the support of landowners in the declaration of prime or suitable areas as public reserves or parks such as, for example, the central part of Rarotonga, a *motu* etc.

g) Promote and support any programmes for the preservation of flora and fauna and marine living objects unique to the Cook Islands.

h) Employ on a short term basis a herbalist to identify plants used in traditional medicinal concoctions.

i) Establish a medicinal herbs farm of especially those plants which are dying out.

Further sectorally-related Government environmental policy

Marine Resources

"...In striving for these aims we will pursue a policy of sound economic exploitation, management and conservation"; and "Maintain strict management and environmental controls over the lagoons to prevent diseases and pollution in these ecologies".

Town Planning

"Encourage greater awareness of the need to properly utilise our lands, soon to become a very scarce resource, through a nationwide education programme"; "Seek funds from wherever possible for town and country planning projects" and "Work in close co-operation with the office of the Environmental Control and Conservation".

Local Government

"Establish Island Council Offices in the Outer Islands ... to assume ... functions ... such as ... beautification programmes, rubbish disposal,... parks, public reserves and recreational areas."

Home Affairs

"...clean and beautiful environment which includes streams and foreshore, provide flowering plants for beautification purposes, landscaping and the establishment of recreational parks etc."

Also within Home Affairs,

"... carry out the following programme:

1) Clean and beautify all government precincts.

2) Encourage a flower and colourful shrubs planting programme along the main and back roads throughout the country.

3) Work closely with the Ministry of Agriculture in the establishment of and management of floriculture nurseries.

4) Organise regular inspections (*tutaka*) with the prizes for various categories designed to encourage the use of flowers and shrubs for landscaping and beautification.

5) Clean all streams and drains and beautify the banks.

6) Initiate a beautification programme covering the whole foreshore area.

7) Encourage the establishment and the proper maintenance of recreation parks and picnic areas."

Arts and Culture

"Promote the restoration and preservation of historic sites and buildings."

Energy

"Encourage home owners and commercial users of electricity to install energy saving devices or alternate energy sources ..."; "...the initiation of a photovoltaic energy system programme in the Northern Group beginning on the islands of Pukapuka, Nassau and Manihiki".

About National Environmental Management Strategies — NEMS

Recent times have witnessed increasing threats to Pacific environments, coupled with an increasing awareness of the need for action. National Environmental Management Strategies (NEMS) are a measure of this awareness and a positive response to these threats.

NEMS, being developed in a number of Pacific countries, outline the major environmental issues faced by each country and identify the steps required to address them. There has been a strong emphasis on the identification of clear, fully costed programmes in each of these steps.

These NEMS have been developed in each country through a process of extensive in-country consultation and gathering of relevant background information. The end result is a document which "belongs" to the government and people of each country. The effective implementation of NEMS will be essential for sustainable development of the region and will involve all relevant organisations.

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national environmental management strategies