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National
Environmental
Management
Strategy

Kiribati

National Environmental Management Strategy

Produced with financial assistance from the United Nations Development Programme (UNDP)

USP Library Cataloguing-in-Publication data:

Kiribati : national environmental management strategy.
—[Apia, Western Samoa : SPREP], 1993.

xix, 80p. : 29cm

Includes bibliographical references.

"Produced with financial assistance from the United Nations Development Programme (UNDP)"

ISBN 982-04-0096-1

1. Environmental policy—Kiribati
2. Environmental protection—Kiribati
3. Conservation of natural resources—Kiribati
I. South Pacific Regional Environment Programme

HC79.E5K57 333.716099681 363.7160996 81

Prepared for publication by the South Pacific Regional Environment Programme, Apia, Western Samoa

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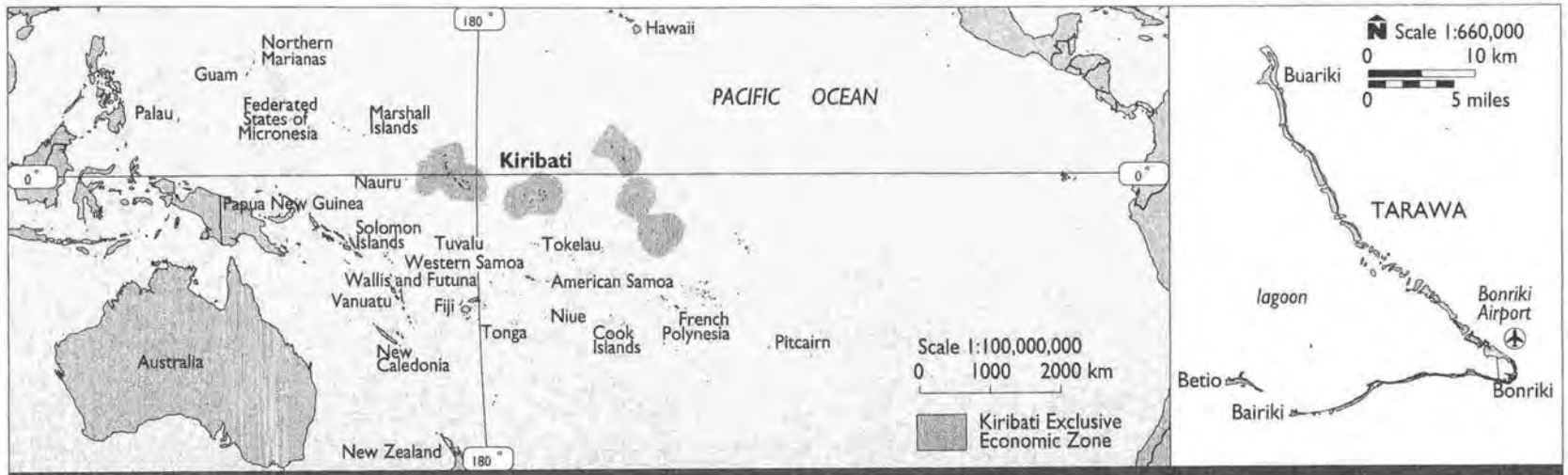
Cover design by Peter Evans based on an original design by Catherine Appleton

Maps supplied by
MAPgraphics, Brisbane, Australia

Typeset in New Baskerville and Gill Sans
Printed on 110 gsm Tudor R.P. (100% recycled) by ABC Printing, Brisbane, Australia

Produced with financial assistance from the United Nations Development Programme (UNDP)

Cover photograph: Traditional mat weaving. (photo: Cait Wait)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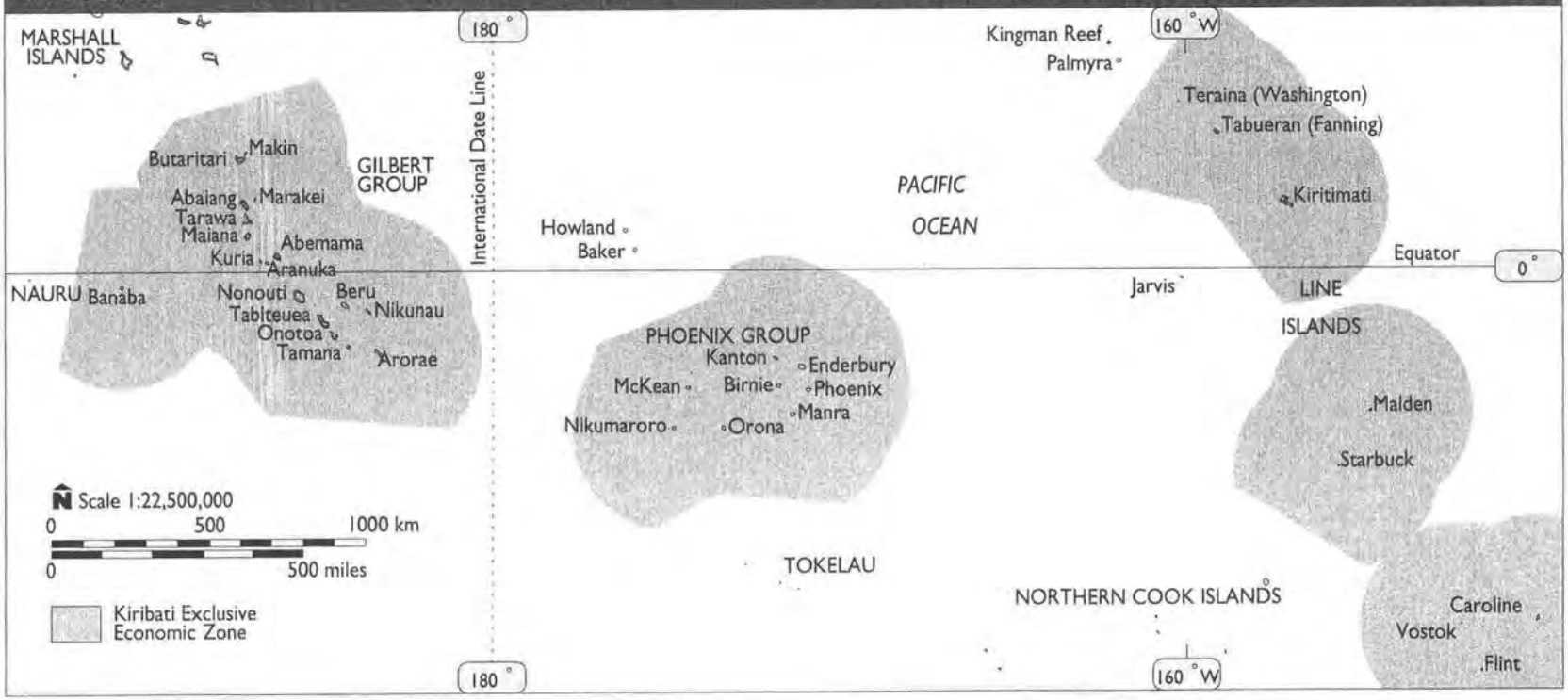
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Foreword

The Government of Kiribati is fully aware of the responsibility it is entrusted with regarding the proper management of its natural resources to ensure the long-term viability of this small island nation. For many generations traditional management of the resources ensured a plentiful supply of the marine life that the I-Kiribati people rely on in their everyday life. The changes that are occurring in Kiribati lifestyle and the movement towards Western-oriented materialism will place increasing and intensifying demands on the environment and natural resources. The Government of Kiribati has endeavoured to keep pace with that change through the development and implementation of appropriate environmental management practices.

It is in this context that the government, through the development of its National Development Plan 1992–1995, has committed itself to the implementation of ecologically sustainable development practices. It is the intention of this government, through the establishment of the Environment Unit and the Task Force on the Environment, to ensure that the functioning of all government departments takes into account the importance of ecologically sustainable development, and takes into consideration conservation of the natural and cultural environment within the decision-making process.

The development and preparation of the National Environmental Management Strategy (NEMS) has been a model of cooperation between the South Pacific Regional Environment Programme (SPREP), the Government of Kiribati, and the community. Through the NEMS preparatory seminars and reviews, a range of environmental issues facing Kiribati were brought forward through generous and thoughtful discussion. Issues identified by the participants at the workshops as requiring action are those issues which the NEMS has addressed in its goal of sustainable development.

There are a number of key elements of the NEMS that the government has identified as requiring immediate attention: the introduction of Environmental Impact Assessment, the development of national environment legislation, and the conservation of Kiribati's precious marine resources. These elements establish the starting point for ecologically sustainable development in Kiribati, and it will be in these areas that government will focus its attention.

In order to achieve these aims, the NEMS has developed a range of programmes that set out in some detail the specific requirements necessary to address the range of environmental issues that have been identified. It is hoped that the implementation of the NEMS, which will be the next major task, will be carried out with the generous assistance of the multilateral and bilateral donors who have the technical and managerial skills to assist Kiribati in its task, and in particular with national capacity building.

The Government of Kiribati would like to thank SPREP for its role in developing the NEMS and looks forward to a continuing close association. The development of NEMS projects in other Pacific Island nations will ensure that Kiribati develops strong regional environment-based affiliations that will be of benefit to Kiribati and to the entire Pacific region.

Tiwau Awira
Minister of Environment
and Natural Resources Development
Republic of Kiribati

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Note The unit of currency in Kiribati is the Australian dollar ($A). All amounts are in Australian dollars unless otherwise specified. Costs in Part 4 (Programme profiles) are in United States dollars ($US).

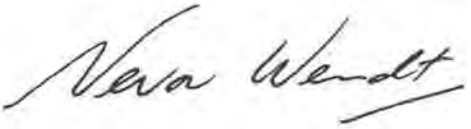
Acknowledgements

Many people have generously contributed their time and expressed their support in a variety of ways, and it would be impractical to attempt to list all of them here. At the same time, the significant contributions made by a special core of people must be gratefully acknowledged.

Our thanks go to Mr Nakibae Teuatabo, Secretary for Environment and Natural Resources Development and the staff of the Environment Unit within the Ministry of Environment and Natural Resources Development, the members of the Kiribati Task Force on the Environment as well as Kiribati government, non-government and community representatives who contributed to in-country workshops, seminars and the reviews of the National Environmental Management Strategy.

The three people in Kiribati with closest involvement in this activity deserve special thanks: Ms Tererei Abete, Environmental Coordinator, who has overseen the project and provided ongoing assistance and coordination of the institutional strengthening activities associated with the NEMS process; Mr Craig Wilson, Environmental Advisor, who has provided valuable technical assistance and advice and who produced the State of the Environment Report; and Mr Timai Tekaai, NEMS Project Officer, who has provided assistance throughout the ongoing NEMS process.

The SPREP Team has been made up of a number of people, both staff members and consultants, providing specific technical assistance. Our thanks go to Mr Iosefa Maiava, Ms Mere Pulea, Professor David Farrier, Mr Neil Taylor, Ms Faustina Rehuher, Mr Laisiasa Tulega and Mr Bismarck Crawley.



Neva Wendt
Team Leader
National Environmental
Management Strategies (NEMS)
South Pacific Regional Environment Programme

Message from UNDP

UNDP's Environmental Strategy and Action Plan focuses on supporting governments in integrating environmental considerations into their development plans. As part of its effort to aid governments in their pursuit of sustainable development, UNDP provides environmental management guidelines that can be applied to all programmes and project cycles.

In this regard, UNDP is proud to be associated with the preparation of National Environmental Management Strategies (NEMS) in seven Pacific Island countries. This was carried out through an institution-building project designed to enhance the capacity of the South Pacific Regional Environment Programme (SPREP) to service its mandate from member governments of the South Pacific Commission for environmental assessment and management.

Under this project, UNDP provided SPREP with legal and financial consultants to working groups charged with guiding SPREP to institutional independence, a strategy consultant to formulate its long-term corporate plan, and an environmental management specialist to oversee the development of NEMS in seven countries. UNDP further supported the United Nations Conference on Environment and Development (UNCED) process by providing funds not only for Pacific regional workshops, but also for airfares and subsistence allowances to enable participation by Pacific Island governments and NGOs in the UNCED Preparatory Committee meetings.

UNDP is also currently planning a follow-up programme which will focus on building capacity in fifteen countries of the Pacific region for the implementation and mainstreaming of the NEMS process in national development efforts.

Economic development strategies in any country must be compatible with environmental goals: the challenge is knowing how to do this. However, making choices and decisions that will eventually promote environmentally sound development requires understanding how the environment functions; identifying what needs to be done to protect, conserve, enhance and preserve it on a long-term basis; and linking national objectives with environmental management activities.

The National Environmental Management Strategies facilitate the making of such choices and decisions through a participatory process which brings together government departments, non-government organisations, and communities in a spirit of inclusiveness and social integration.

UNDP therefore applauds the timely publication of the National Environmental Management Strategy for Kiribati. This document will undoubtedly provide a further stimulus to the integration of environmental considerations into the national process to ensure the planning and management of development in a sustainable manner.

Anthony R. Patten
Resident Representative
United Nations Development Programme

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 preparation of National Environmental Management Strategies (NEMS) in several Pacific Island countries has been a major tool in addressing these issues. This undertaking was made possible through the generous financial assistance of the United Nations Development Programme (UNDP). This assistance is gratefully acknowledged.

The Kiribati National Environmental Management Strategy (NEMS) is a practical document which aims to identify Kiribati's major environmental issues and the priority environmental programmes required to address them. The emphasis has been on ownership of the NEMS by the government and the people of Kiribati. The process which has resulted in the preparation of the NEMS has involved many participants and has been directed by a National Task Team, comprising relevant government and non-government organisations in Kiribati.

The NEMS process has proved a most useful vehicle for raising awareness of environmental issues. However, the success of the NEMS exercise will ultimately be judged by its implementation. If the NEMS document sits on a shelf and gathers dust, then the exercise has failed.

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

Vili A. Fuavao
Director
South Pacific Regional
Environment Programme

Acronyms

AMAK	Aia Maea Ainen Kiribati
ARP	Atoll Research Programme
DSA	Daily Subsistence Allowance
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
IOE	Institute of Education (University of the South Pacific)
IUCN	World Conservation Union
KTFE	Kiribati Task Force on the Environment
MENRD	Ministry of Environment and Natural Resources Development, Kiribati
MEST	Ministry of Education, Science and Technology, Kiribati
MFEP	Ministry of Finance and Economic Planning, Kiribati
MHARD	Ministry of Home Affairs and Rural Development, Kiribati
MHFP&SW	Ministry of Health, Family Planning and Social Welfare, Kiribati
MWE	Ministry of Works and Energy, Kiribati
MTCT	Ministry of Transport, Communication and Tourism, Kiribati
NEMS	National Environmental Management Strategy
NGO	non-government organisation
RIS	Resource Information System
SPBCP	South Pacific Biodiversity Conservation Programme
SPREP	South Pacific Regional Environment Programme
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
USP	University of the South Pacific
WCED	World Commission on Environment and Development
WCS	World Conservation Strategy

Glossary

Kiribati words

maneaba	Village meeting hall.
te bun	Ark shell.
te bwabwai	Giant swamp taro.
unimane	Elder men.

General

algae	Non-flowering, stemless water-plant, especially seaweed and phytoplankton.
aquaculture	The farming of marine or freshwater plants and animals.
balance of payments	Earnings from exports compared with overall spending on imports.
bilateral and multilateral	Bilateral aid or trade agreements are made between two governments or organisations. Multilateral agreements are made between more than two countries or organisations.
biodiversity	The variety of plants and animals in an area. Biodiversity refers not only to the number of different species but to the full range of genetic variation within each species.
ciguatera	Fish poisoning.
conservation	Managing the way people use natural resources so that they give the greatest sustainable benefit today, while keeping their full potential to meet the needs and aspirations of future generations.
consumption	Spending on everyday items, for example, food, petrol, rent, clothing etc.
deforestation	Clearing of trees or forest.
degradation	The result of poor resource use which pollutes, damages or reduces the quality of resources available to future generations.
demography	Measures of change in size and age structure of a population.
disclimax	Vegetation which has established itself in an unstable habitat.
disturbed	Change in the natural order as the result of human activities or climatic change.
ecology	Branch of biology which deals with the relation of plants and animals to their environment.
economic growth	The increase in the value of goods and services produced in a country, usually measured over a year.

ecosystem	A community of plants and animals and the environment they inhabit.
effluent	A liquid flow.
endangered species	Species that are in danger of extinction.
endemic	An animal or plant which is found only in one region or country and is not present naturally in any other part of the world.
environment	All the living and non-living things in a particular place or on the earth generally, and the way they interact or work together.
erosion	The wearing away of the earth's surface (for example, soil) by the action of water, wind etc.
fauna	Animals.
flora	Plants.
greenhouse effect	The trapping of the sun's warmth in the lower atmosphere of the earth caused by an increase in carbon dioxide due to increased pollution. Carbon dioxide is more transparent to solar radiation than to the reflected radiation from the earth.
gross domestic product	The money value of all goods and services produced in a country. This value is used to measure a country's national income over a year.
groundwater	Water found in soil or in the pores and crevices in rock.
guano	Build up of bird droppings in places inhabited by large colonies of sea birds.
habitat	The natural home of a plant or animal species.
heritage	A nation's historic buildings, monuments, places etc., especially when regarded as worthy of preservation.
hydrological	Relating to water, whether surface water in rivers or groundwater available in wells.
indigenous	Something that originally occurred in a particular area.
infrastructure	The basic structural foundations of a society or enterprise. Also refers to basic facilities such as roads, airports, electricity and communication systems.
introduced species	A species which does not naturally occur in a particular area but rather has been brought in from outside.
investment	Spending on projects or activities which are expected to provide long-term benefit.
natural resource	A naturally occurring stock or supply which can be used to help meet human needs and wants.
neap tides	Tides which occur during the second and fourth quarters of the moon.
nutrient	A substance providing essential nourishment for the maintenance of life.
ozone layer	A layer of ozone in the stratosphere which absorbs most of the sun's ultraviolet radiation.
pelagic fish	Fish that live in the open ocean rather than close to shore.
permeable	Able to be penetrated, for example, by water.
pesticide	Chemical that kills unwanted organisms.
primary sector	Activities relating to agriculture, fishing, forests, mining etc.
private sector	Activities and enterprises run by individuals or groups on a profit-making basis.
public sector	Activities and enterprises run by government.
resource	A stock or supply which can be used to help meet human needs and wants.
ruderal vegetation	Vegetation growing on rubbish heaps or waste places.
sediment, sedimentation	Matter which settles to the bottom of a liquid.

sewage	Waste matter, especially from toilets, conveyed in sewers.
sewerage	System of pipes to carry toilet waste.
species	A scientific name given to each different type of animal or plant.
strategy	A plan to help achieve certain goals.
subsistence	Producing mostly for own consumption, for example, farming which directly supports the farmer's household without producing a significant surplus for trade.
sustainable	Using a resource in such a way that its supply and quality are maintained indefinitely into the future.
terrestrial	Relating to the earth.
threatened species	Species which are likely to become endangered species.
toddy	A drink made from coconut; it may be fermented (alcoholic) or boiled to make a sweet syrup.
toxic	Poisonous.
trolling	To fish by drawing bait along in the water.
understorey vegetation	A layer of vegetation beneath the main canopy of a forest.
vascular plant	A plant with conducting tissue.
vegetation community	A commonly occurring grouping of plants and trees.
wetland	Swamp or other damp area of land.

Executive summary

Background to the NEMS

The consultation process is vital to the development of any management strategy where its implementation is dependent on the action of individuals and communities. The process to develop this National Environmental Management Strategy has been one of consultation and consensus-seeking.

It involved a number of steps including reviews of environmental education and environmental legislation in Kiribati, the conduct of national seminars (involving NGOs, church groups, and other community leaders) and the preparation of the Kiribati State of the Environment Report (Wilson 1994). As well, much information here on the natural and human-made environment has been taken from the Kiribati country report prepared for UNCED (Thaman et al. 1992), the environment sector review undertaken by the Asian Development Bank (ADB 1993) and the Kiribati National Development Plans (Sixth and Seventh) (Republic of Kiribati 1993). The NEMS document has also been thoroughly reviewed by the Kiribati Task Force on the Environment (KTFE) and has been endorsed by Cabinet for implementation.

In order to be successful, a National Environmental Management Strategy must also be formulated in the context of the overall natural, socio-economic, cultural and political environment. Chapter 2 provides a brief overview of the Republic of Kiribati in terms of its location and size, climate, land and sea resources, culture and history, people, government, resource ownership and economic development. It is not the intention to reproduce here the detailed information contained in the country report for UNCED or the State of the Environment Report. Chapter 2 simply highlights the key issues which are necessary for an understanding of the discussion of strategies and programmes for addressing major environmental concerns. The key issue raised here is that of a resource base which is limited and vulnerable — thus the need for government to lead by example in setting Kiribati on a more sustainable path to development.

Overall country goals

The broad objective of the Kiribati government for the environment sector is "to achieve an environmentally sustainable development and better quality of life". Specifically, this calls for government to:

(1) manage and plan for ecologically sustainable development and conservation of coastal areas, habitats and resources;
(2) develop and implement coastal planning and management;
(3) improve administrative arrangements and legislation;
(4) control pollution and have an effective waste management system;
(5) strengthen the capability of national institutions to carry out pollution and monitoring and research;
(6) increase knowledge and understanding of Kiribati's resources and environment; and
(7) improve policies, methods and technical advice on environment issues.

Overview of proposed strategies and programmes

The NEMS document discusses possible environmental management strategies to achieve these

national goals, particularly the goal of sustainable development. There is some emphasis on biodiversity conservation in these strategies, but clearly the focus is on the sustainable use of species or ecosystems. Overall, the NEMS aims to provide a longer-term view of a range of strategies and programmes through which Kiribati may achieve sustainable development.

However, the Kiribati NEMS must in some respects be viewed as a snapshot in time, and changes in circumstances will surely modify this snapshot. Certainly, the number of programmes and actions suggested for government consideration is indicative of the broad range of possible strategies for addressing the goals of the Kiribati NEMS.

The list of programmes presented in this document has been derived from the same consultative process which developed the NEMS. They have been considered and endorsed by the Kiribati Task Force on the Environment and Cabinet. However, it must be emphasised that policy decisions regarding priorities for strategies and programmes are rightly matters for government, and any suggestions relating to prioritisation made in this NEMS document should be viewed in that light.

NEMS broad objectives

The strategies for attaining sustainable development in Kiribati are presented in this document under five broad objectives.

- Objective 1 — Integrating environmental considerations into economic development (Chapter 3)
- Objective 2 — Improving environmental awareness and education (Chapter 4)
- Objective 3 — Development and protection of the resource base (Chapter 5)
- Objective 4 — Improving waste management and pollution control (Chapter 6)
- Objective 5 — Balanced development, planned urbanisation and lower population growth rates (Chapter 7)

Integrating environmental considerations into economic development (Objective 1)

To achieve sustainability of resource use and environmental conservation, it is necessary to integrate environmental safeguards into economic decision making. This has been recognised throughout the world and the region, and was one of the recurring themes at the NEMS seminars held in Tarawa in June and July 1993. There are a number of steps which can be taken immediately on a national level to ensure such integration. These could be carried out under five strategies for proper environmental management.

(1) Adopt an integrated approach to environmental policy and planning.
(2) Submit proposed policies, development programmes and projects to Environmental Impact Assessment.
(3) Introduce a comprehensive framework of national and local environmental law, together with means for enforcement which are socially acceptable and culturally sensitive.
(4) Review adequacy of institutional mechanisms and administrative controls and strengthen them as necessary.
(5) Institute resource pricing in national accounts and other economic policy for achieving sustainability.

These strategies, and the programmes associated with them, are outlined in detail in Part 3.

Improving environmental awareness and education (Objective 2)

Effective long-term environmental management will require an informed and supportive public. This has been a recurring theme in the seminars held during the preparatory phase of the NEMS. A number of areas for improvement have been identified. In the formal sector there is a need to fully integrate environmental topics in the school system by increasing their relevance, their inclusion in examination subjects, and improving teachers' ability and confidence to use them.

In the area of non-formal education and public awareness, there is a need for the development and use of audio-visual materials. There is also a need to make more use of NGOs (including church groups) and island councils in awareness raising programmes, given their extensive contacts with the community.

A key obstacle in promoting sustainable development is the lack of real-life experience in sustainable resource-use practice. Thus, there is the need to revive and integrate into educational systems those aspects of I-Kiribati traditional knowledge

and resource management systems which sustained human populations on such a limited environment for centuries.

Development and protection of the resource base (Objective 3)

Because Kiribati's terrestrial resources are limited, with land itself the scarcest resource of all, I-Kiribati are conscious of the continued need for resource protection. The government has also initiated many programmes directed towards sound resource conservation and preservation, within the capacity of its resources. Emphasis in this environmental management objective will focus on the following issues.

(1) Global warming and sea-level rise
(2) Technical data/information on the resource base
(3) Unsustainable development practices
(4) Agricultural quarantine
(5) Energy conservation

The need to promote the sustainable development of each of the key physical resources (terrestrial and marine) is also discussed.

Improving waste management and pollution control (Objective 4)

One of Kiribati's major concerns is to improve the management of waste and the control of pollution, particularly in South Tarawa where about 23,112 or 32 per cent of the total population live. With such limited space and a vulnerable resource base (limited soils, narrow water lens, well used lagoons and exposed foreshores), there is concern that if nothing is done to dispose of solid waste and sewage properly, the degradation of the environment will become of critical concern. The strategies suggested to achieve this objective are as follows.

(1) Improved management and disposal of solid waste and sewage
(2) Control of hazardous chemicals
(3) Control of marine pollution
(4) Commitment to international pollution control

Balanced development, planned urbanisation and lower population growth rates (Objective 5)

One of the problems highlighted in this NEMS document is Kiribati's high rates of population growth (2.4 per cent annually) and the imbalance in its distribution, with about 96 per cent living in the Gilbert Group, and one-third of the total population located on the tiny islets of South Tarawa.

The problems associated with such a large and unevenly distributed population in a country like Kiribati are enormous, given the very limited land resource base. The government, in recognition of the problem, has responded with two far-sighted policies: it is giving high priority to family planning; and it is actively encouraging the resettlement of families from South Tarawa and other areas of the Gilbert Group to the Northern Line Islands.

Strategies to achieve a population/urbanisation objective would include one on the development of a national population policy; one to promote balanced (that is, more decentralised) development; and another to improve control over urbanisation. These are naturally interrelated and must be implemented accordingly.

Implementation

The most appropriate body to manage the implementation of the NEMS is the Kiribati Task Force on the Environment (KTFE). This was originally set up to oversee the preparation of the Kiribati country report for UNCED and has since been formally established to consider policy guidelines on environmental issues. The KTFE has been divided up into smaller operational committees to focus on separate strategies of the NEMS which means that it will be more operational and effective. The KTFE could also have an advisory role to Cabinet and could continue reporting to the Minister for Environment and Natural Resources Development.

One of the most important functions of the KTFE is to ensure that funding is sought through the KTFE Secretariat (Environment Unit) in time for proposed implementation, and to ensure that review of progress of the NEMS takes place regularly.

PART I
The Kiribati setting

Chapter 1

Introduction

1.1 Why a National Environmental Management Strategy?

General

Environmental strategies are the means for promoting sustainable development through the integration of economic development with conservation and sustainable use of resources. According to *Caring for the Earth: A Strategy for Sustainable Living* (IUCN/UNEP/WWF 1991), successful strategies have four components:

- consultation and consensus-building
- database development and analysis
- policy formulation
- action plans and implementation.

The consultation process is vital to the development of any management strategy where its implementation is dependent largely on the action of individuals and communities. At the end of the consultation process, there must be consensus on what to do and how to do it; without consensus, strategies will be ineffective, for there will be no sense of ownership, and without ownership compliance is unlikely to be achieved. This is particularly true of an egalitarian and consensus-minded society like Kiribati. The most realistic strategy, then, in terms of compliance, is one derived in part from a wide participatory process of problem recognition, planning, and policy formulation.

Information needs

Effective strategies are built on facts (IUCN/UNEP/WWF 1991). In order to formulate policies

Drying coconuts. (photo: Craig Wilson)

and action plans, information is needed about people, the economy, natural resources and the state of the environment, and about institutions, laws and policies which promote or obstruct sustainable development. For such information to be of use, it also has to be stored in a form that is readily accessible and easily used and updated by non-specialists.

There are many gaps in this sort of information in the Pacific. But, given the urgent need for policies to guide development in the region, decisions could still be made on the basis of available information, as long as policies and programmes resulting from such decisions can be adjusted as additional information becomes available, and provided the initial decision does not result in irreparable environmental damage.

Strategy basis

The process to develop this overall strategy has been one of consultation and consensus seeking. It is based on the studies, consultations, reviews, and other efforts that have gone into the overall National Environmental Management Strategies (NEMS) process.

The Kiribati National Development Plans (Sixth and Seventh), the country report prepared for UNCED (Thaman et al. 1992), the environment sector review undertaken by the Asian Development Bank (ADB 1993), the environmental legislation and education reviews undertaken by SPREP as part of the NEMS process (Pulea & Farrier 1994; Taylor 1994), the results of previous national workshops and seminars held in Tarawa, and the contributions of various people and agencies including government departments, NGOs, church groups and others have all influenced and guided the drafting of this document. It has also been thoroughly reviewed by the Kiribati Task Force on the Environment before being submitted to Cabinet for government approval.

Policy issues

The development of appropriate action plans will be carried out under the policy direction that ensures development is implemented on an environmentally sustainable basis. The policy of sustainable development is formally endorsed by government in its National Development Plan. The government has also established an Environment Unit within the Ministry of Environment and Natural Resources Development, and there is a proposal for an overall Environment Action Plan.

However, there is currently no environment legislation and no official national government environment policy, and action plans and programmes obviously should not be formulated in a policy vacuum. Nevertheless, this NEMS exercise has pointed to certain policy directions which the government and people of Kiribati are proposing and are likely to take, and the strategies and programmes suggested here are a constructive step along those policy lines. The strategies and programmes could be refined and different tactics will perhaps evolve as more information is available, and as government formalises its environment policy.

1.2 The World Conservation Strategy

Global context

In 1980, the international organisations of the World Conservation Union (IUCN), United Nations Environment Programme (UNEP) and the World Wildlife Fund (now World Wide Fund for Nature) (WWF) published the World Conservation Strategy (WCS), which stated that conservation could not be achieved globally without efforts to alleviate the poverty and misery of millions of poor people. It was argued that environmental degradation had brought about poverty for millions of people, who in their attempts to survive caused further ecological damage, which in turn led to more poverty.

The message of the WCS was very clear: the combined destructive impact of a poor majority struggling to stay alive and an affluent minority consuming most of the world's resources was progressively reducing the planet's life-supporting capacity, and undermining the very means by which all people can survive and flourish. To break this vicious cycle, the WCS advocated the integration of conservation and sustainable development, defining conservation as:

> ... the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of the future generations (IUCN/UNEP/WWF 1980).

The WCS emphasised three objectives:

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

In 1987, the report of the World Commission on Environment and Development (WCED 1987) was released, adding clarity and conviction regarding the global interdependence between economics and environment. This was the same year which saw the groundwork laid for the Earth Summit, the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in June 1992, and for which Kiribati prepared a country report (Thaman et al. 1992).

In 1991, IUCN, UNEP and WWF published in partnership *Caring for the Earth: A Strategy for Sustainable Living*. The intention of the document was "...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" (IUCN/UNEP/WWF 1991).

The approach in this strategy document for Kiribati is premised heavily on the conceptualisation and strategies contained in these two IUCN/UNEP/WWF documents. In fact, some of the strategies advocated by those two documents are directly relevant to the Kiribati situation, and have been adopted or adapted here.

1.3 Scope of the NEMS

The National Environmental Management Strategy (NEMS) is a longer-term view of a range of strategies and programmes through which Kiribati may achieve sustainable development. There is some emphasis on conservation of biodiversity, but clearly the focus of the Kiribati NEMS is on the sustainable use of species or ecosystems.

The Kiribati NEMS must in some respects be viewed as one snapshot in time, and changes in circumstances will surely modify this snapshot. However, to the extent that the ideal situation or goals are clearly defined in this document, it is unlikely that the main strategies, programmes or tactics will vary greatly. Certainly, the number of programmes and actions suggested for government consideration is indicative of the broad range of possible strategies for addressing the goals of the Kiribati NEMS.

The list of specific programmes presented in this document has been derived from the same consultative process which developed the NEMS. They have been considered and endorsed by the Kiribati Task Force on the Environment and Cabinet. However, it must be emphasised that policy decisions on priorities for strategies and programmes are rightly matters for government, and any suggestions relating to prioritisation made in this NEMS document should be viewed in that light.

Chapter 2

The setting

2.1 Location and size

A National Environmental Management Strategy must be formulated in the context of the overall natural, socio-economic, cultural and political environment in order to be successful. This chapter provides a brief overview of the Republic of Kiribati in terms of its location and size, climate, land and sea resources, culture and history, people, government, resource ownership and economic development.

It is not the intention to reproduce here the detailed information contained in the country report for the United Nations Conference on Environment and Development (Thaman et al. 1992) or in the State of the Environment Report (Wilson 1994). Instead, this chapter will highlight the key issues which are necessary for an understanding of the discussion of strategies and programmes for addressing major environmental concerns.

The Republic of Kiribati is made up of 33 coral islands and atolls located in the central Pacific. It consists of three main island groups — the Gilbert Group in the west, the Phoenix Group in the centre, and the Northern and Southern Line Islands to the east. The islands are extremely small (total land area of 820 sq km), with an Exclusive Economic Zone (EEZ) area of 3.5 million sq km between 5°N and 11°S and 170°E and 150°W.

The sea to land ratio is a staggering 4000:1. The islands are isolated and fragmented, extending some 3,870 km from Banaba on the west to Kiritimati (Christmas Island) in the east; and 2,050 km from Teraina (Washington Island) in the Northern Line Islands to Flint in the Southern Line Islands.

The land and ocean areas of Kiribati are distributed throughout the three main island groups as follows.

Table 2.1 Land and ocean areas (sq km)

Group	Land area	Sea area
Gilbert Group	278	1,098,300
Phoenix Group	29	758,600
Line Islands	516	1,649,500

Source: MENRD records

The Gilbert Group consists of 17 small atolls or limestone islets, including Tarawa. The size of the islands ranges from Tamana and Makin, with areas of 4.7 and 7.9 sq km, to Maiana, Abaiang and Tabiteuea, with areas of 16.7, 17.5, and 37.6 sq km respectively (Woodroffe & McLean 1992). Tarawa, the most populous, has islets with an estimated area of 31 sq km, extending over 64 km from north to south (McLean 1989, cited in Woodroffe & McLean 1992). The Phoenix Group consists of eight islands with a total land area of only 29 sq km. All are low atolls with enclosed lagoons.

The Line Islands are made up of three northern islands — Teraina (Washington), Tabueran (Fanning) and Kiritimati (Christmas) — and five southern islands, with a total land area of 516 sq km (or 62.7 per cent of total land). Kiritimati, with an area of 363.7 sq km, is the largest island in Kiribati.

2.2 Climate

Kiribati is located in the dry belt of the equatorial oceanic climate zone, with mean daily temperatures ranging from 26°C to 32°C, with the recorded highs and lows being 22°C and 37°C respectively. Annual rainfall is extremely variable, both annually and between islands, with the annual average in the Gilbert Group ranging from about 1,000 mm for

the drier islands near the equator to 3,000 mm for the wetter islands in the far north, and 2,024 mm at Tarawa.

Rainfall in a good year in the Phoenix Group ranges from 1,000 mm to 3,000 mm, while the Line Islands vary from about 700 mm at Kiritimati to more than 4,000 mm at Teraina some 400 km away to the north. Severe prolonged droughts, with as little as 200 mm of rain per year, are common, particularly in the central and southern Gilbert Group, on Banaba, the Phoenix Group and on Kiritimati.

Winds between the north-east and south-east quadrant occur throughout the year and provide some reprieve from the hot sun. During the drier months from June to November, the winds are generally from the south-east, while during the wetter months of the year, December to May, the winds are from the north and east. Strong winds, showers and squalls occur from the north-west to south-west quadrant. Tropical cyclones rarely form within 5° either side of the equator. However, gale force winds from the south-west and north sometimes occur when cyclonic systems develop in latitudes greater than 5° north and south.

2.3 Land resources

2.3.1 Water

Apart from a number of landlocked salt-water lagoons and salt pools, there are almost no surface fresh-water resources on Kiribati. The only permanent fresh-water resource is groundwater in the form of a 'lens' of often slightly brackish fresh water, hydrostatically 'floating' on the higher density salt water beneath the island. The height of the lens above sea level and the level of salinity vary in relation to the elevation, shape and width of islets, the amount of water use, and rainfall which is the only source of replenishment for the lens. There is one fresh-water lake on Teraina, and on Kiritimati there are over 100 small saline lakes, some several kilometres in diameter. Otherwise, freshwater supplies are limited in quantity and quality, and even on the larger, wetter atolls, periods of water scarcity do occur.

2.3.2 Soils

The atoll soils of Kiribati, possibly the most infertile in the world, are young (3,000 to 4,000 years old), shallow, alkaline, coarse–textured and, because of their immaturity, similar to the coral limestone parent material. They consist of layers of organic material in varying thickness, coral sand and coral fragments overlaying a limestone platform. The soils lack the trace elements iron (Fe), manganese (Mn), copper (Cu) and zinc (Zn), and the high pH values (8.2 to 8.9) restrict availability of these elements for plant growth.

Plant growth is dependent on the breakdown of organic materials and the activity of soil organisms, as these provide humic acid which lowers pH and enables the uptake of nutrients. Unfortunately, activity of soil micro-organisms is limited, and the level of organic material is low due to coarse-textured soils and rapid rainfall infiltration. These factors together make conventional agriculture, as practised on larger Pacific islands, very problematic in Kiribati, and have led to the development of an extensive composting technique by I-Kiribati growers.

The plateau soils of Banaba vary from shallow soils, composed of organic materials, sand or dolomite on the tops of limestone pinnacles, to deep phosphatic soils and phosphatic rock between the pinnacles. A substantial proportion of the soils has been extensively mined, leaving isolated rock pinnacles. Undisturbed plateau soils have a high organic content and good fertility levels.

On a number of islands throughout Kiribati, there are deposits of phosphate-rich soils which are guano accumulations from extensive sea bird colonies, particularly those associated with stands of *Pisonia grandis*. These soils are more acidic and darker than the surrounding soils and contain additional nutrients for plant growth.

Soils occurring in the wetland areas of Teraina and other low-lying areas within Kiribati are more acidic and fertile, as the acidity associated with waterlogged soils makes plant nutrients more available.

2.3.3 Minerals

The mineral resources of Kiribati include sand, coral, gravel and limestone rock aggregate; tricalcic phosphate rock; guano deposits; and undetermined, potentially important, unexploited concentrations of deep-seabed polymetallic manganese nodules and cobalt-rich crusts.

The action of wind, water and wave-driven coastal processes on the coral limestone parent

materials has resulted in the formation of extensive deposits of sands and coral rubble of varying texture, particle and size, location and quantity.

The phosphate on Banaba has been exhausted and although there is a possibility of secondary mining, it is not likely that it will be implemented in the short term. A number of islands in Kiribati contain deposits of guano developed from extensive sea bird populations, with the largest of these on Tamana (approximately 200,000 tonnes containing 15 to 20 per cent calcium phosphate). Deposits in the Phoenix Group and the Line Islands were mined in the mid and late 1800s.

Deposits of cobalt-rich crusts and manganese nodules have been located in the seabeds of the Phoenix Group and Line Islands. Deep-sea ferromanganese deposits have been considered a potential economic source of the metals nickel, copper, cobalt and manganese, although they are not likely to be of any significance to Kiribati in the short to medium term due to high extraction costs.

2.3.4 Vegetation and flora

Indigenous vegetation

The indigenous vegetation and flora of the atolls of Kiribati are among the poorest on earth. With the exception of some of the uninhabited islands in the Phoenix and Line groups, the coastal strand, mangrove and inland forest vegetation of Kiribati have been severely modified due to:

- thousands of years of habitation and selective removal of indigenous species for construction, boat building, firewood and other purposes;
- the expansion of monocultural coconut groves for export production of coconut oil and copra;
- the expansion of coastal settlements, which in urban South Tarawa occupy much of the coastline;
- the widespread practice of allowing pigs to forage freely along beach flats; and,
- in the case of Banaba, seventy years of open-cut phosphate mining.

The terrestrial vegetation associations of Kiribati are limited to:

- coastal strand vegetation;
- limited areas of mangroves and coastal marsh vegetation;
- relic stands of inland forest; and
- in the case of Banaba, limestone escarpment or pinnacle vegetation.

'Te kaina', Pandanus tectorius. Its fruits are a staple food source and the fronds are used for handicrafts. (photo: Cait Wait)

Secondary and cultural vegetation

Secondary and cultural vegetation associations include:

- agricultural lands dominated by coconut palms, including giant swamp taro or 'te bwabwai' pits under various stages of cultivation and fallow;
- house yards and village gardens;
- extensive and variable areas of ruderal vegetation; and
- in the case of Banaba, almost an entire island under severely modified disclimax vegetation in various stages of succession after some seventy years of open-cut phosphate mining.

Essentially, there is no remaining primary inland forest in the main Gilbert Group, with all of it, except for the rare relic or individual tree, having been replaced by coconut-dominated vegetation associations. Some of the wetter islands of the Line

Islands, such as Tabueran and Teraina, support closed groves of *Pisonia*, coconuts and pandanus.

House yards and village gardens contain a greater proportion of introduced exotics and tree crops including coconut palms (often planted for toddy production), pandanus, papaya, native fig or 'te bero', and breadfruit. Other food plants found in the village gardens include the ceremonial staple giant swamp taro, 'te bwabwai', which is also cultivated in pits.

Due to increasing salinity and the declining importance of 'te bwabwai' relative to copra production, cash employment and imported food, a large proportion of the pits on some islands have been abandoned, although on the wettest island of Butaritari there is only limited or periodic evidence of neglect or serious under-utilisation, with some households having over 2,000 sq m in productive pits. Otherwise, coconut groves are the major vegetation type in Kiribati, especially in the Gilbert Group.

Number of species

The flora of the main Gilbert Group consists of approximately 306 species, of which only 83 are possibly indigenous. None are endemic. The balance is comprised of ornamentals, weedy exotics, food plants, and a limited number of other useful cultivated plants.

Although greatly outnumbered by exotics, indigenous species still dominate some of the most disturbed habitats, as well as constituting the most culturally and ecologically important species. A large proportion of these species (40 of 83 for the Gilbert Group) are severely restricted in distribution, endangered or possibly extinct, due to removal and severe habitat modification or limitation. The flora of the Phoenix Group and Line Islands is poorer, with totals for Tabueran, Kiritimati and Teraina of the Line Islands numbering only 123, 91 and 69 respectively; with regards to the indigenous species, the totals are only 23, 25 and 19 respectively.

2.3.5 Fauna

In contrast to Papua New Guinea and Solomon Islands where the fauna are among the richest in the world, Kiribati's fauna is among the poorest. Its native terrestrial fauna has only one reported endemic vertebrate, the Christmas Island warbler *(Acrocephalus aequinoctialis)*, and the only mammal (probably an aboriginal introduction) is the Polynesian rat (*Rattus exulans*).

There are probably no indigenous land mammals in Kiribati. The main indigenous land animals are birds, insects and some land crabs. Some of these constitute resources of considerable importance.

In terms of bird life, with the exception of the few introduced by humans, most are sea birds or migratory species. The lagoonal and pelagic environments in Kiribati provide an abundance of marine avifauna which nest primarily on uninhabited atolls or islets, and in vast number on the uninhabited atolls of the Phoenix Group and Line Islands. On the Northern Line Islands, 19 species of sea bird are known to breed, while on Kiritimati, colonies numbering in excess of 6 million birds have been established, constituting the largest number for a single island in the world.

The rich avifauna constitutes an important resource both to the people of Kiribati and to the world. In fact, the islands constitute the most extensive system of seabird rookeries in the world, a system which should be protected because of its important role in the oceanic ecosystem. Although no reserves exist in the Gilbert Group, numerous reserves and wildlife sanctuaries have been established in the Phoenix Group and Line Islands.

The insect fauna constitutes the majority of the terrestrial animals found on atolls. Many are important to the functioning of atoll ecosystems, although some, such as mosquitos and flies, are pests and spread disease.

2.4 Marine fauna and flora

2.4.1 Marine fauna

Kiribati's relatively rich marine fauna, which includes between 600 and 800 finfish species alone, is a critical strategic resource. Although living marine resources are also important to the larger island countries, they are for many of the smaller countries such as Kiribati the *sole* opportunity for substantial economic development. The main categories of fisheries resource in Kiribati include (1) the lagoonal and reef, or inshore fishery; (2) the offshore fishery, which includes both pelagic and near-shore deep water fisheries; and (3) mariculture or aquaculture of finfish and seaweed.

The most common marine resources include:

View of Abaiang. Edible shell fish and other marine resources found in the intertidal region in areas like Tarawa and Abaiang are widely harvested and form an important part of the diet. (photo: Craig Wilson)

- rock lobsters found on surrounding reefs of the Gilbert Group although they do not appear to be a significant food item;
- deep-water shrimp, which live at depths of 150–800 metres and have been considered for economic use although no resource assessment has been carried out;
- coconut crabs, known from the Phoenix Group and Line Islands. The mantis shrimp or 'te waro' is sought after as a food item;
- four species of giant clams found in the Gilbert Group — *Tridacna gigas* or 'te kima'; *T. squamosa* or 'te were matai'; *T. maxima* or 'te were'; and *Hippopus hippopus* or 'te neitoro'. Giant clams have been utilised as a food source and for their shell as an incidental trade item;
- the ark shell or 'te bun', found in the intertidal region occurring naturally on Tarawa, Abaiang, Marakei, Maiana, Abemama, Tabiteuea and Nonouti. It is widely harvested and forms an important part of the diet;
- the pearl oyster shell which occurs in low densities on Abemama, Abaiang, Butaritari and Tabueran;
- tuna: the pelagic fish resource is centred on the tuna fishery which is dominated by the species skipjack, yellowfin and bigeye;
- inshore fish resources which include snapper, mullet, milkfish, bonefish, shark and barracuda; and
- turtles, which are a source of food for traditional and non-traditional users. The hawksbill, loggerhead, Olive Ridley, leatherback, and green turtles have been reported in Kiribati. Nesting sites have been recorded on many of the Phoenix Group and Line Islands and on some islands of the Gilbert Group.

2.4.2 Marine flora

The marine flora comprises the seaweeds and seagrasses that are found in the tidal areas throughout the islands of Kiribati. Although the marine algae of Kiribati has been studied, it is the commercial species of seaweed grown in Kiribati that has attracted most of the attention. *Eucheuma cottonii* was introduced to Kiribati to be grown on a commercial basis in a number of selected lagoons following initial trials on Kiritimati and Tabueran.

2.5 Cultural and historical resources

Radiocarbon dating reports from around the neighbouring islands (Marshall Islands) suggest that there has been human settlement in the general Micronesian area for 3,000–4,000 years. To date, only limited scientific archaeological study

has been made, although the potential richness of archaeological sites in Kiribati is recognised and a list of some such sites has been compiled by the Cultural Division of the Ministry of Education, Science and Technology. Tarawa was the scene of one of the bloodiest battles of the Pacific campaign of World War II and many relics of the war remain, especially on Betio, including Japanese command posts, bunkers, naval guns and field artillery.

But perhaps the most significant cultural resource of Kiribati lies in what could be called the I-Kiribati conservation ethic which has ensured a sustainable way of life within atoll environments. Given the severe limitations of their physical setting, the I-Kiribati had to develop such a conservation ethic. That they have survived over the last 3,000 years is testimony to the appropriateness of such a way of life.

The development of the I-Kiribati conservation ethic was based on an extensive knowledge of their land and sea. Some of the main mechanisms included extensive composting methods, secrecy about fishing grounds, restrictions on the consumption of certain species (for example, some species such as turtles or giant clams were reserved for chiefs or priests), fines or penalties for resource abuses, and clan tenure or limited access to reef and lagoon areas. Much could be learned and incorporated from these traditional conservation methods in current efforts to forge a more sustainable development path for Kiribati.

The conservation ethic remains strong among most of Kiribati's rural peoples but is under pressure, especially in the urban areas.

2.6 The people

Ethnically, the I-Kiribati are Micronesians, although there is some Polynesian influence due to long contact with that region, particularly with Tuvalu to the south. The population, estimated in 1991 at 72,298, is unevenly distributed, with 96 per cent living in the Gilbert Group; one third of the total population lives on the tiny islets of urbanised South Tarawa. Averaged over the entire country, the population density is 85 per sq km; however, South Tarawa has a density of 1,515 per sq km, with 4,500 persons per sq km on Betio. Population density on Betio is expected to rival that of Hong Kong by the end of the century.

The average annual growth rate of natural population increase is 2.4 per cent. However, emigration is estimated at 0.3 per cent, which results in a net annual population growth rate of 2.1 per cent. With this rate, the population is expected to double in 35 years. Considerable internal migration can also be observed from the outer islands to urban South Tarawa. In the period 1985–1990, the number of migrants to South Tarawa was approximately 5,000 people, reflecting the rural to urban drift.

Of the emigrants, about 1,000 are working in the phosphate mine on Nauru and a few hundred others are engaged as merchant seamen. The remittances sent by migrant workers and seamen average about $A4 million a year, and constitute a significant source of income for Kiribati families (Republic of Kiribati 1993). However, with the projected cessation of the phosphate mining early in the 21st century, such a source will diminish and the migrants will return, increasing the pressure on the resources in both urban and rural areas in Kiribati.

The population is relatively young, with 40 per cent under 15 years and a median age of 20 years. Of the four atoll nations of the Pacific (Kiribati, Marshall Islands, Tokelau and Tuvalu), Kiribati is reported to have the highest rate of infant mortality (82 per 1,000 live births) and an average life expectancy at birth of only 53 years (ADB 1993).

2.7 Economic description

General

Development in Kiribati is constrained by severe limitations in the quality and quantity of available land. The fragmented and scattered nature of land makes it extremely difficult to manage the development process. The country's major asset, its sea, is vast but with only a limited capacity to utilise it, Kiribati is not receiving the full potential benefit from it. The country's isolation from world markets is another development constraint.

Over 80 per cent of the Kiribati workforce is engaged in subsistence agriculture and fishing, which provide most of the basic needs of the people in the outer islands. There have been attempts to encourage market orientation of the economy but with limited success. The production base of the country remains very narrow, with exports mainly of fish and copra. The performance of these two commodities in recent years has not been good due

to poor fish catches and low world market prices for copra. Today, there is very little infrastructural or other economic development outside Tarawa and Kiritimati.

Public sector activity

With little in the way of private sector activity, the public sector and public enterprises dominate economic activity. Low skill levels and the limited capital base outside government have meant that the latter remains responsible for providing essential basic services, including electricity generation, fuel supply, communications, shipping, printing and even hotel operation, generally through direct investment and the establishment of statutory bodies. The efficiency of these public sector enterprises has often been low and the government has established policy guidelines for the transfer of such service enterprises to the private sector. The government is actively encouraging the establishment of small-industry production of consumer goods to broaden the production base and foster import substitution (Republic of Kiribati 1993).

Development issues

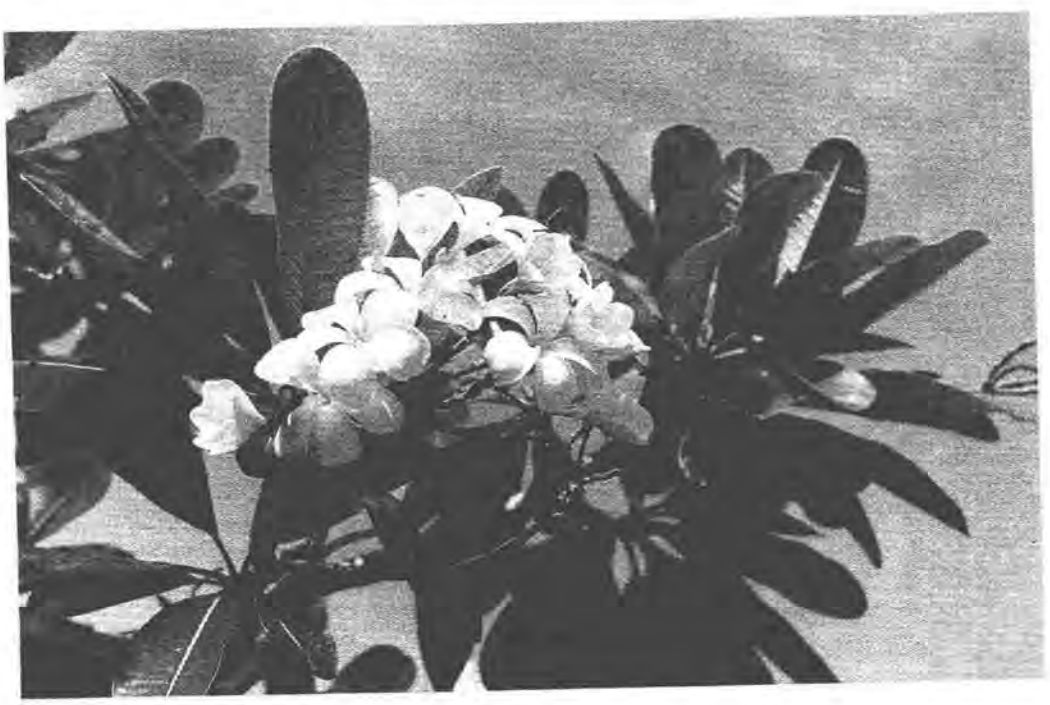
With little comparative advantage in regard to conventional economic indicators, the development process has been understandably slow. This has helped minimise the adverse effects of rapid growth and resource depletion which, as seen in the case of Banaba, is not always in the best interest of the I-Kiribati.

But herein lies the dilemma with which the government and people of Kiribati are grappling. As is commonly known and admired, the I-Kiribati have lived a relatively sustainable way of life for thousands of years in the atoll environment. But this was at a relatively low level of material well-being, a level which is no longer considered adequate by many I-Kiribati.

This is particularly true of those in South Tarawa who desire some of the more appropriate modern technologies and social services that will make their life easier, safer, healthier and more enjoyable in today's world. A higher level of material well-being naturally requires increased cash incomes, foreign exchange, and changes in lifestyle which, if not pursued in the right manner, could undermine the cultural and traditional resource-use systems which have promoted sustainability in the past.

Structure of the economy

One of the most interesting legacies of British colonialism in Kiribati is that the one asset which could have provided the means to sustain higher material well-being, the phosphate on Banaba, was exhausted just before independence in 1979, immediately cutting foreign earnings and government revenues in half. The resource gap resulting



'Te meria', Plumeria obtusa, is used in flower garlands for decorative and ceremonial purposes. (photo: Cait Wait)

from mining cessation quickly turned a positive domestic savings rate into a highly negative one. The gap over the years has been covered by withdrawals from the interest income of the Revenue Equalisation Reserve Fund (RERF), and generous grants from friendly donor countries (Teuea 1993).

The government has tried to live within its means and has followed a very tight fiscal policy. This is reflected in the fact that external debt and debt service remain at less than 1 per cent of exports of goods and services, while substantial external reserves are held in the RERF. Over the past ten years the value of the RERF has risen from approximately $70 million in 1979 to $260 million at the end of 1991.

The Gross Domestic Product (GDP) at factor cost showed a drop of more than 4 per cent in 1990 and has been stable since then, with a prediction of growth being generated from the fishing sector. Income from the reserve fund, grant-in-aid, fishing licensing fees and significant levels of remittances from I-Kiribati working overseas have been other major contributing factors to the modicum of economic stability Kiribati has experienced in recent years.

But the economy remains very open and vulnerable. Imports account for about 75 per cent of GDP. Customs revenue from imports, fish royalties and withdrawals from interest income on accumulated external assets abroad, contribute over 75 per cent of government revenue. Imports (at around $30 million a year) continue to outstrip exports (at around $5–6 million a year), resulting in a trade deficit in the order of $24–25 million a year.

Kiribati is also highly dependent on external assistance, which in 1990 was nearly $US 300 per capita. In fact, since 1982 external assistance has been equivalent to around 40 per cent of GDP, and accounts for 95 per cent of gross investment.

Thus far, the government has managed to balance its books without having to overuse its limited resource base. However, as the cash imperative becomes more pronounced and as more and more I-Kiribati start desiring modern technologies and social services, the Kiribati government will need to balance the need for more and immediate cash income against long-term environmentally sustainable development.

PART 2
Environmental strategies and programmes

With the publication of the World Conservation Strategy (WCS) in 1980 came the clear message that conservation and development must not be regarded as incompatible (IUCN/UNEP/WWF 1980). Without due regard to conservation, development can only be short-term and cannot be sustained. Since then, and with the growing recognition of the essential interdependence between conservation and development, the term "sustainable development" has become common usage in describing the goal of, and umbrella strategy for, conservation. It is also in this manner that the term is being used in this NEMS document.

If there is any difficulty in using the term sustainable development, it is due to the fact that it could be interpreted in many different ways. In *Caring for the Earth*, the definition used is:

> The use of an organism, ecosystem or other renewable resource at a rate within its capacity for renewal.

The same document referred to the concept of sustainable development in a more general way as:

> Improving the quality of human life while living within the carrying capacity of supporting ecosystems (IUCN/UNEP/WWF 1991).

In other words, sustainable development is about surviving in the long term. In this respect, sustainable development is something that the I-Kiribati have excelled in for a very long time. Otherwise, they would not have survived on such a limited (fragile) resource base.

The problem today is that the traditional way of life of the I-Kiribati, although sustainable, was at a level of material well-being no longer considered adequate by many people, especially those in South Tarawa. New types of economic development are required for higher material well-being to be achieved. Unfortunately, the new types of development models being applied in the region and Kiribati do not promote sustainability, so the challenge for Kiribati is to derive maximum benefit from the available resources without jeopardising their capacity for renewal.

Given this and the types of concerns discussed throughout this report, the broad objective of the Kiribati government for the environment sector is "to achieve an environmentally sustainable development and better quality of life". This objective is also commonly known as "utilising the natural resources without compromising the ability of the future generations to live out of the same resources". The Kiribati government

wants development to improve the quality of life of its people, but in such a way that the carrying capacity of the supporting ecosystems is not exceeded. Other long-term objectives are:

- to improve public understanding of the potential impacts of climate change and of other environmental issues;
- to develop and implement a national programme to understand and mitigate the potential adverse impacts of global environment change;
- to promote the concerns of Kiribati through international and regional fora, conventions and action programmes (Republic of Kiribati 1993).

The specific goals for the environment sub-sector are to:

- manage and plan for ecologically sustainable development and conservation of coastal areas, habitats and resources;
- develop and implement coastal planning and management;
- improve administrative arrangements and legislation;
- control pollution and have an effective waste management system;
- strengthen the capability of national institutions to carry out pollution monitoring and research;
- increase knowledge and understanding of Kiribati's resources and environment; and
- improve policies, methods and technical advice on environment issues (Republic of Kiribati 1993).

The following chapters discuss possible strategies to achieve these goals, particularly the goal of sustainable development, and define specific programmes for implementation.

Objective 1 — Integrating environmental considerations into economic development

3.1 Introduction

A number of concerns have been expressed about the current policy and institutional arrangements in Kiribati as they pertain to the need to integrate environmental considerations into economic development (Thaman et al. 1992; Wilson 1994; ADB 1993). These concerns relate to:

(1) the absence of comprehensive environmental legislation to guide policy and programme formulation;
(2) the need for stronger institutional arrangements for implementing environmental programmes; and
(3) the lack of clarity or urgency regarding policy/administrative instruments which the government can use to enforce environmental protection.

3.2 Legislation

There is as yet no formally stated policy or comprehensive programme for environmental planning and management, although this is now being addressed through the NEMS. However, a number of existing ordinances relate to various aspects of the environment. Examples include:

- *Harbours Ordinance 1957*, which prohibits the discharge of sewage or other filth into a harbour;
- *Fisheries Ordinance 1977*, which provides for the regulation and conservation of fisheries resources, and for licensing of foreign fishing vessels;
- *Local Government Act 1984*, which restricts activities which will cause land erosion and degradation;
- *Wildlife Conservation Ordinance 1975*, which provides for the protection of designated bird species and definition of sanctuary areas;
- *Prohibited Areas Ordinance 1957*, which permits designation of prohibited areas for the purposes of environmental conservation on any island in Kiribati; and
- *Land Planning Ordinance 1973*, which provides for land use planning, zoning, and the establishment of regulations for the conservation of the natural environment (Pulea & Farrier 1994).

These ordinances need updating (to meet current environmental concerns and to relate to relevant international conventions) and their environmental regulatory content integrated into national umbrella legislation on the environment. Indeed, the development of specific environmental legislation is seen as an urgent priority, including the successful determination of socially acceptable and culturally sensitive penalties for breaches of its provisions. With regard to enforcement, greater use could be made of the relevant aspects of the I-Kiribati traditional/customary law, which, if strengthened, are more likely to gain acceptance than anything based on Western traditions.

Current legislation does not make Environmental Impact Assessment (EIA) procedures mandatory and this needs to be addressed in any new legislation. Also, the principle of sustainable use of natural resources needs to be more explicit in legislation.

3.3 Institutional considerations

General

Up to now, environment-related policies have been relatively scattered in nature, and individual government departments have retained day-to-day functional responsibility for environmental concerns relevant to their own sectors. This has made it difficult to address various environmental concerns in a comprehensive manner. In recognition of this constraint, the government moved to establish an Environment Unit (EU) which is now within the Ministry of Environment and Natural Resources Development (MENRD); appointed an environmental coordinator for the EU; and set up a Kiribati Task Force on the Environment (KTFE).

Environment Unit

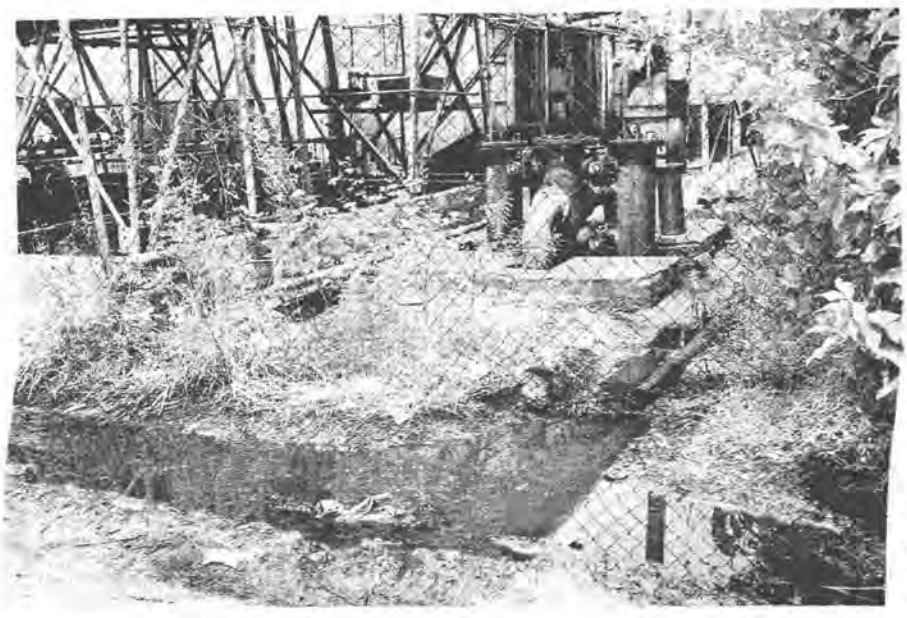
The Environment Unit within MENRD is the prime body charged by government with coordinating and integrating environmental concerns with other development policies and programmes. But, under the present law with its tendency to scatter environmental responsibilities among various departments, island and town councils, the Unit has a limited mandate (more will be said later about the need for a more comprehensive framework of national environmental law and enforcement). Until now, limited headway has been made with regards to the Unit's primary function: integration of environmental concerns with development planning.

The Unit has been strengthened by the arrival of the Environmental Advisor, an Environment Education Officer and the addition of another I-Kiribati project officer. However, with its broad multi-disciplinary role, the operation of the Unit is hampered by inadequate staffing for the size of the task, a lack of specific environmental training, and limited financial support, the result being that it has been reactive rather than proactive. Expansion of the Unit for specific tasks such as policy development and the establishment of legislation could be of great benefit.

Kiribati Task Force on the Environment

Initially, the Kiribati Task Force on the Environment was set up informally for a single purpose, the preparation of the country report to UNCED, but it has now been established formally to advise on environmental policies. Its composition, with members drawn from all the relevant government agencies and NGOs, is intended to reflect the cross-sectoral nature of environmental concerns.

There is some concern, however, that with 14 members, it is probably too large and diverse to be able to focus effectively on specific environmental areas such as coastal zone management, biodiversity conservation, marine pollution and public awareness (ADB 1993) — thus the proposal to divide the KTFE into operational sub-committees to focus on each of the main problems/strategies. There is also some concern that there may be insufficient input by the general public into the deliberations of the Task Force.



Oil contamination at the Betio powerhouse. Continual small-scale discharge can result in groundwater contamination. (photo: Craig Wilson)

Other institutional issues

In general, other institutional constraints to effective environmental management include:

- lack of well-qualified personnel/local expertise to deal with specific areas of the environment;
- acute training needs of technical staff in various sectors involved in tackling environmental issues such as coastal zone management, degradation, and impact of population on dwindling local resources;
- lack of technical and financial capabilities, hence the need for capacity building; and
- lack of accountability for the effects of one's actions on the environment.

3.4 Environmental administrative and policy instruments

Planning

Physical planning is central to environmental management. In Kiribati, responsibility for land use planning is shared between the Central Land Planning Board in the Ministry of Home Affairs and Rural Development, and local government administration through town councils and constituted under the Local Government Act 1984. This is one of the weaker institutional arrangements, which may be understandable given the lack of land throughout the country.

This problem is particularly severe on South Tarawa which, due to high population and demand for land, is now one of the most land-scarce atolls in the Gilbert Group. Government-leased lands within the areas of Betio, Bairiki and Bikenibeu, which are designated for planning purposes, are virtually saturated and can now only accommodate projects with limited space requirements. Problems are also occurring on South Tarawa, especially Betio, from squatters occupying lands that have not been zoned or not yet properly laid out for housing.

Under such conditions, the government and its urban planners do not have much flexibility. Even if urban planners were to apply greater skill and imagination to the problem of land shortage and environmental problems associated with land use development, the lack of resources to pursue different options will limit what they can do.

One thing which could assist in decision making for land use development is the requirement for Environmental Impact Assessment, which is lacking at present. Enforcement of the law and early inspections and assessment of buildings and all developments will also help.

Economic policy

Economic policy can also be an effective instrument for promoting environmental protection and ensuring the sustainable use of natural resources. Older models of economic planning, which many countries (including Kiribati) are still using, do not take the full value of natural resources and services into account. On the other hand, new models being developed take into account the depletion of goods, including natural resources, and the decline in the various supports provided to people through the environment. There is obviously a need to consider these more recent perspectives. For Kiribati, this may include a review of options for institutional strengthening.

Environmental Impact Assessment

Of immediate concern, however, is that development proposals are not subject equally to Environmental Impact Assessment (EIA) as to economic and financial appraisal. Just as economic assessment is a routine aspect of project appraisal, environmental examination should be both routine and of equal status with economic assessment. Indeed, in view of the limited and fragile nature of Kiribati's resource base, an economic appraisal would be quite deficient without a parallel environmental appraisal.

Policy development

Environment policy development and evaluation has been addressed in a general way through the National Development Plan in its approach to environment issues such as global warming, sustainable development and environment education. However, a more detailed development of policy at a departmental level would ensure that the issues of environment are addressed by all sectors of government.

The development of policy should then be followed by a process of policy evaluation to ensure that policy development is current in international and regional terms, and that it reflects the needs of the nation.

Summary

To achieve sustainability of resource use and environmental conservation (Objective 1), it is necessary to integrate environmental safeguards into economic decision making. This has been recognised throughout the world and the region, and was a recurring theme at the NEMS seminars held in Tarawa in June and July 1993. There are a number of steps which can be taken immediately on a national level to ensure such integration, and these could be carried out under five strategies for proper environmental management.

3.5 Specific strategies to achieve Objective 1

- Strategy 1.1 — Adopt an integrated approach to environmental policy and planning
- Strategy 1.2 — Submit proposed policies, development programmes and projects to Environmental Impact Assessment
- Strategy 1.3 — Introduce a comprehensive framework of national and local environmental law, together with means for enforcement which are socially acceptable and culturally sensitive
- Strategy 1.4 — Review adequacy of institutional mechanisms and administrative controls and strengthen them as necessary
- Strategy 1.5 — Institute resource pricing in national accounts and other economic policy for achieving sustainability

These strategies are elaborated below, as well as priority programmes associated with them.

Strategy 1.1 Adopt an integrated approach to environmental policy and planning

General

Economic and environmental considerations must be integrated if a society is to function in a sustainable way. To this end, it is necessary for government to ensure an effective, integrated approach and to provide a national framework of institutions, economic policies, laws and regulations, and information base. An area for early consideration by the government is how to integrate, both institutionally and procedurally, its policy evaluation, economic planning, physical planning, environmental protection and sectoral development programming activity.

Existing initiatives

The Government of Kiribati has already indicated that it wishes to address this matter through the adoption of an integrated approach towards multi-sector issues such as those for environmental management. A major initiative in this respect has been the creation of a focal point for environmental matters within the Ministry of Environment and Natural Resources Development (MENRD), which was done to integrate the exploitation of natural resources with conservation and the protection of the environment.

The establishment and composition of the Kiribati Task Force on the Environment (KTFE) also reflects this desire to integrate various elements of environmental management planning within one comprehensive programme. The idea is to bring together the different players including the various ministries and town councils which continue to be responsible for environmental matters within their mandates and sectors. It has also been suggested that special attention needs to be given to the role of NGOs, churches and councils, as the close contact they have with the communities they represent should encourage maximum public input, support and participation.

Further necessary steps

Successfully adopting the principle of integrating environment and economic planning at the highest level would entail the following:

- formal adoption of the principle of sustainability, with integration of environmental and economic considerations built into the terms of reference of government agencies dealing with national economic policy and planning, and into key sectoral policies — thus facilitating the reorientation of the development approach to accommodate alternative and more holistic development models;
- incorporation of the principle of sustainable development into the mandates and policies of the sectoral line departments;
- promotion of common approaches to economic and environmental planning in both the public and private sectors;
- promotion of open consultation mechanisms

with local communities and the pursuit of traditional consensus approaches to decision making;

- the continuation and strengthening of the Kiribati Task Force on the Environment to be responsible for the integration of economic, environmental and physical planning with the policy evaluation process, and to ensure that the policies are integrated in all levels of government; and
- upgrading the capacity of the Environment Unit to carry out initial screening of project proposals received and of existing procedures concerning the need (or otherwise) for Environmental Impact Assessment.

Much of the work required here could be undertaken by the government using local resources, but where external assistance is deemed necessary, it could be provided through one of the other programmes proposed in this report.

Strategy 1.2
Submit proposed policies, development programmes and projects to Environmental Impact Assessment

Levels of EIA

The Environmental Impact Assessment (EIA) process occurs on a number of levels according to the likely effect of a proposal on the environment. The first stage of the process is an initial screening to determine the appropriate level of assessment required.

The lowest level of EIA may only require a written description of the project and be subject to limited requirements in reporting.

A medium level of EIA would require that the project conform to regulations determined in consultation with the Environment Unit, the relevant ministry and the project developer.

A full and comprehensive EIA is used to predict the likely economic, social, cultural and biological consequences of a proposed activity (that is, not just the effect on the environment). EIA is a very important planning tool for government. It helps identify potential problems and hence aids planning to prevent adverse impacts, or to reduce them to acceptable levels, before investment is committed.

A full EIA is applied in cooperation with all relevant ministries to those development projects which a preliminary screening indicates are likely to have major economic, social, cultural or biological impacts. But all development projects — public and private, foreign and local — must be subjected to that initial screening process. The size of the economic investment in a development proposal is no criterion for the potential magnitude of the environmental impact. For all projects which are likely to have significant environmental impact and are allowed to go ahead:

(1) an environmental management programme should be included in the project design; and

(2) the capacity for proper monitoring should be assured (from either internal or external sources), to compare the eventual outcome with the predicted effects, and thus permit adjustment of the planned development process.

Rural coastal view of North Tarawa. (photo: Cait Wait)

Timing and extent

EIA should always be undertaken early in the project cycle. For development assistance agencies, EIA should begin immediately from the country programming mission stage and continue through pre-feasibility and feasibility stages. Subsequently, annual programming mission teams from international agencies such as the Asian Development Bank and the World Bank should include a person experienced in environmental appraisal.

EIA must extend beyond development projects to all national and sectoral programmes. Therefore, the institutional EIA capacity should be located at the central level of government, where development and sectoral policies, programmes and projects are evaluated.

Programme 1.2.1
Development and application of standard EIA guidelines

Aim and scope
To develop a set of standard EIA guidelines to be accompanied by detailed administrative procedures for their implementation, and training of responsible officers in EIA.

Strategy 1.3
Introduce a comprehensive framework of national and local environmental law, together with means for enforcement which are socially acceptable and culturally sensitive

General

In order to achieve harmony between environmental policy and economic decision making at national level, comprehensive and consistent legislation will need to be introduced. Such legislation would contain a set of clearly defined principles of sustainable use and conservation of the nation's natural and cultural resources, and in this regard it should include provision for mandatory EIA procedures.

The law should also incorporate administrative and enforcement procedures which integrate traditional and modern management practices. This means the incorporation of procedures which are or have been part of community life and traditions. In this respect, it is worth noting that the Local Government Act 1984, which provides for a system of island councils, has been a particularly important instrument for environmental management and protection. Several island councils have adopted by-laws prohibiting destructive or wasteful fishing methods with the view to conserving stocks and ensuring that the resource provides a more equitable benefit to all members of the community.

One of the strategies which the Kiribati government has used with relative success has been the use of international fora and agreements (treaties, conventions etc.) to try to influence external forces which have a bearing on the environment.

Main elements

The implementation of this strategy would entail the following elements:

- review of existing legislation of relevance to the environment (Pulea & Farrier 1994, undertaken as part of the NEMS process);
- research/review traditional and customary laws of Kiribati pertaining to the conservation of resources and sustainable use;
- drafting an umbrella national Environment Act reflecting the principle of sustainable development; and
- establishing a new environmental administration structure as appropriate.

Programme 1.3.1
Research/review of resource-use customs and traditions

Aim and scope
To research and identify those aspects of I-Kiribati customs and traditions of resource use which could be incorporated into the proposed Environment Act.

Programme 1.3.2
Prepare and guide development of the national Environment Act

Aim and scope
To draft an Environment Act and associated administrative policies and structure, and to guide it through the process of ratification. Socially acceptable and culturally sensitive penalties for breaches of the Environment Act provisions should also be determined as part of the project.

Strategy 1.4
Review adequacy of institutional mechanisms and administrative controls and strengthen them as necessary

Aims

The aim of the review is to strengthen local capacity, particularly in the following areas:

(1) development of specific environmental legislation together with socially acceptable

and culturally sensitive penalties for breaches of its provisions;

(2) capacity building, particularly in the area of data collection and analysis for environmental management and monitoring. Within the Environment Unit, there is a need for some specific training and infrastructural development including telecommunications and data storage and handling systems. The Environment Unit has begun the process of integrating environmental concerns with economic development by fostering closer institutional links between the Environment Unit and the Planning Unit of the Ministry of Finance and Economic Planning; and

(3) development/restructuring of the Kiribati Task Force on the Environment to make it more effective and operational.

Additional elements

This strategy for institutional strengthening would include a number of elements, some of which require no external assistance for their implementation:

- development of comprehensive legislation with socially implementable penalties (needs external assistance);
- strengthening the national environmental administrative capacity through the Environment Unit and the Kiribati Task Force on the Environment (KTFE):
  — strengthening the Environment Unit (needs external assistance);
  — further development of inter-sectoral administrative mechanisms for environment management; restructuring of the KTFE;
- supporting the development by the KTFE of an overall Environment Action Plan, of which the NEMS is part;
- adoption of EIA by government as routine;
- development of EIA guidelines and standards (needs external assistance);
- using economic policies such as resource accounting to help achieve sustainability;
- continued strong government support for population control measures (needs external assistance);
- fostering outer island development to encourage voluntary resettlement.

The requirements under this strategy could be met through the projects identified under the other strategies of this NEMS.

Strategy 1.5
Institute resource pricing in national accounts and other economic policy for achieving sustainability

Economic instruments

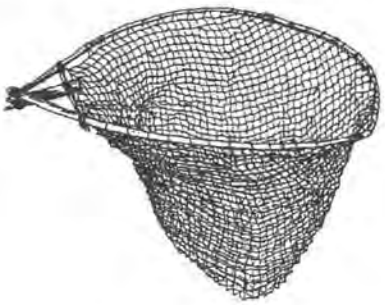
There are many broad economic instruments which countries can apply as flexible and efficient means of promoting sustainable development. In Kiribati, as in all other Pacific islands, there is a need to review existing monetary and fiscal policies for their impacts on sustainable resource management and environmental protection. Taxes or subsidies supporting activities which damage ecosystems or resources should be reviewed.

New economic instruments should also be considered as a way of promoting sustainability. For example, where the full cost of a service or resource is not borne by the user, this serves to lessen the interest in conservation. During the course of the NEMS seminar in Tarawa in June 1993, many participants expressed interest in the introduction of the 'user pays' or 'polluter pays' principle as a way of both reducing unnecessary depletion of resources and providing a strong incentive for pollution control. For example, importers and users of non-biodegradable materials should pay at least part of the costs of collecting and disposing of the materials safely.

Pricing policies and standards can also be used to encourage government, industry and communities to adopt resource-efficient technology. For instance, high prices for imported fossil fuel and for electricity from such imports can promote greater use of solar energy, which for a country like Kiribati would seem natural.

If the Kiribati government is to take fully into account the effects of its policies, it will need to adopt environmental and resource accounting procedures. Much of the work required here could be undertaken by the Kiribati government itself, perhaps with technical assistance through some of the programmes suggested above.

Chapter 4



Objective 2 — Improving environmental awareness and education

4.1 Introduction

Effective long-term environmental management will require an informed and supportive public. This has been a recurring theme in the seminars held during the preparatory phase of the NEMS.

With regard to formal education, a review carried out as part of the NEMS preparation found that:

- although considerable progress has been made in providing environmental education and in availability of resource materials, there is a need to improve the ability and confidence of primary school teachers to use materials effectively;
- the non-inclusion of environmental science in subjects for examination under the Common Entrance Examination in all but a few schools is a disincentive to teaching it at primary level;
- there is a lack of appropriate (that is, from and about the Pacific region and Kiribati) resource materials on the environment and, in the case of junior levels in non-government schools, there is an acute shortage of any environmental materials at all;
- there is also a lack of materials including some display materials and other resources on the Pacific environment (Taylor 1994).

4.2 Significant issues

Importance of education for compliance

With regard to enforcement of environmental legislation, it is assumed that if people are informed about regulations and the reasons for them, they are more likely to comply. This was argued strongly in the June 1993 NEMS seminar, with suggestions for the development of new environmental legislation and administrative procedures to be accompanied by a public education programme.

Targeting resource owners

It can be argued that it is the resource owners who decide what activities will occur on their land, and it is therefore they who have the greatest effect on the environment. In the case of Kiribati, the government plays a large role in social and economic development, and is therefore seen by many as having the major impact on the environment.

Thus, awareness-raising programmes must not only target individual resource owners, but target politicians and government officers as well. Women must also be included, particularly as their daily work always affects the environment, and they have an important role in shaping the attitudes of children.

Working at the community level

Currently, the non-government groups and churches have extensive networks at the community level which would make them important channels for conveying environmental messages. The island and town councils should also play key roles in educational programmes.

Range of materials

In the area of non-formal education and raising public awareness of environmental issues, little use has been made of audio-visual materials. Other forms of media suggested for delivery of environmental messages include regular radio programmes, newspapers, seminars/workshops by church groups, as well as the more formal education process.

The following strategies for improving environmental awareness and education (Objective 2) are recommended for immediate adoption and implementation.

4.3 Specific strategies to achieve Objective 2

Strategy 2.1 Review and upgrade the status of environmental education

The main element of this strategy is to review and upgrade the status of environmental education in Kiribati. A review of the (formal) environment education in Kiribati has been carried out and its conclusions have been discussed above (Taylor 1994). Its recommendations below could be adopted by the Kiribati government as part of its educational strategy for the environment:

(1) the subject of environmental science be developed under the restructured education system with reference to examinations in post-primary schools;
(2) a national workshop on environmental science take place as soon as possible to familiarise primary teachers and head teachers with Class 7 environmental science materials presently being distributed;
(3) the Class 6 environmental science books be completed, printed and distributed to schools;
(4) a further national workshop take place to familiarise teachers and head teachers with the Class 6 environmental science materials;
(5) the collaborative exercise between SPREP and the Institute of Education (IOE), University of the South Pacific (USP) continue to produce pupils books and teachers guides for the lower primary classes;
(6) work begin, in collaboration with the Ministry of Education, Science and Technology (MEST) and USP, on an integrated science course suitable for the proposed new junior secondary sector;
(7) packages of regionally produced resource materials on the environment be distributed through MEST for use in teachers workshops to develop environmental science; and

Lantana, an introduced plant. The natural vegetation of Kiribati has been subjected to widespread disturbance due to human settlement and the introduction of exotic plant species. (photo: Rupert Blaydon)

(8) a package of videos and materials for display be sent to MENRD and MEST for distribution to educational institutions such as Tarawa Teachers College to strengthen their environmental science content.

Every endeavour must be made to ensure not only that environmental education is made an integral part of formal education at all levels, but also that it is directed to the community at large to raise public awareness of environmental issues and sustainable development principles.

Summary

The education/awareness strategy for Kiribati, therefore, would aim at:

- improving environmental content of curricula and developing more appropriate resource materials;
- developing community awareness programmes through workshops/seminars and other more traditional forms of art, which should result in:
  — more public support for environmental management activities, and

— more responsible actions and ability to make decisions based on understanding of sustainable development issues;

- training government officers in environmental awareness especially the extension officers in resource, education and health departments, and the designated environmental officers within the sector ministries;
- raising the environmental awareness of decision makers and leaders at government and community levels; and
- improving knowledge of, preserving, and integrating traditional management systems into the environmental education and management programmes.

Programme 2.1.1
Establishment of an environmental education and information section within the Environment Unit of the Ministry of Environment and Natural Resources Development (MENRD)

Aim and scope
To establish an environmental education and information section within the Environment Unit of MENRD for the production and dissemination of resources and environmental information, and to coordinate environmental awareness campaigns under other proposed programmes in this strategy document.

Programme 2.1.2
Environmental awareness workshops

Aim and scope
To promote environmental awareness throughout Kiribati and to engender grass-roots participation in environmental planning and management.

Programme 2.1.3
Development of environmental fact sheets, educational resources and audio-visual aids, and alternative media for awareness campaigns

Aim and scope
To identify and develop environmental information resources and alternative media for the community education programmes of NGOs, churches and other groups with extensive community networks.

Strategy 2.2
Preserve and apply traditional knowledge and management systems

Given the importance of traditional knowledge and management systems to the sustainable development of Kiribati, every effort should be made to preserve those elements which enhance the conservation of resources. Perhaps one of the most effective ways of doing this is to integrate aspects of traditional, sustainable, resource-use systems for atolls into both formal and informal education systems.

Programme 2.2.1
Documentation and integration of traditional knowledge and management systems into the education system

Aim and scope
To document traditional resource knowledge and management systems and incorporate them into the education system.

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Objective 3 — Development and protection of the resource base

5.1 Introduction

Because Kiribati's terrestrial resources are limited, with land itself the scarcest resource of all, I-Kiribati are conscious of the continued need for resource protection. The Kiribati government, within the capacity of its resources, has also initiated many programmes directed towards sound resource conservation and preservation. Nevertheless, there is need for greater effort because of the pressure on some resources due to increasing vulnerability to climatic conditions, population growth, and changing lifestyles and needs.

5.2 Key general issues relating to Objective 3

This chapter will focus first on the important general issues which have direct impact on the status of Kiribati's resource base and the efforts to develop it in a more sustainable manner (Objective 3). These are the following.

- Issue 3.1 — Global warming and sea-level rise
- Issue 3.2 — Technical data/information on resources
- Issue 3.3 — Unsustainable development practices
- Issue 3.4 — Agricultural quarantine
- Issue 3.5 — Energy conservation

Discussion of these issues will be followed by discussion of each of the key terrestrial and marine resources, and priority programmes associated with them.

Issue 3.1
Global warming and sea-level rise

General

The government and people of Kiribati are acutely aware of the threat posed by the predicted climate change and potential sea-level rise. Such sea-level

This former 'te buia i taari' is now used as a rest area to enjoy the cooler sea breeze. (photo: Donna Dawber)

rise will result in loss of land area, which a country with such limited and low-lying land areas like Kiribati can ill afford. The coastline, which for the most part is the entire country, will become more prone to storm surge and erosion, and coastal infrastructure, including ports, airports and causeways linking atoll islets, will be subject to greater risk, thus making it even harder to invest in commercial ventures.

Fresh-water supplies

But possibly the most serious immediate consequence of sea-level rise would be a reduction in the size of the fresh-water lens. On small islands there tends to be brackish water interface between the water bodies which can be influenced by tidal change, so as the sea level rises, lateral leakage will increase and lenses will become thinner.

There is already much concern about the quantity and quality of fresh-water supplies in the country, particularly in the more over-crowded South Tarawa with its problems of sewage, chemical residues (fertiliser, pesticides and batteries etc.), and industrial discharges. Further salt-water intrusion is therefore a major issue. Sea-level incursion and sea sprays will also adversely affect agricultural production systems, particularly the production of pit-grown taro.

Global and local implications

The government believes that addressing the underlying causes of the problem is a matter of great urgency, as well as taking all possible local measures to protect the future habitability of Kiribati. There is a feeling that industrialised countries are the major contributors to global warming and at a national seminar held in Tarawa in August 1993 to review the draft NEMS document, a suggestion was made for some effort to solicit funds from the major producers of greenhouse gases for mitigative and adaptive programmes including the building of sea walls and appropriate defensive structures.

At the same seminar, there was also a call for more local action. One suggestion was to cut back on the burning of fossil fuel and look more towards alternative energy sources, particularly solar.

Assessing actual vulnerability

Given Kiribati's concern about the effects of predicted sea-level rise, there is a need to assess critically the vulnerability of the islands to the range of predicted rises to provide a factual base for development planning. More specifically, the data from such assessment would be invaluable for:

- the development of coastal zone management strategy and planning regulations;
- estimating possible rate of loss of fresh-water lenses; and
- the appraisal of risk to vital infrastructure, and major engineering needs for protection (sea walls etc.).

Programme 3.1.1
Vulnerability assessment and coastal zone protection

Aim and scope

(a) To review work already done on Kiribati's vulnerability to projected sea-level rise, and advance it to a level where it is possible for economic and resource development planners to generate appropriate coastal zone management strategies.

(b) To institute early protection measures against coastal erosion through coastal vegetation establishment and rehabilitation.

The assessment of island vulnerability would include assessment of: coastal exposure to greater erosive forces and inundation of land, sea ports and airports, roads and causeways; fresh-water lenses and salt-water intrusion; and impacts on flora and fauna, agricultural production, sewage disposal, and cultural and historical sites.

Issue 3.2
Technical data/information on the resource base

General

One of the difficulties with the protection of natural resources is the lack of data on the status of each of the major resources, the pressures they are under, sustainable yield, and alternatives. A technical database on natural resources is vital for making correct technical decisions, thereby assisting in formulation of sound policies and programmes for the sustainable development of resources. Such information is also necessary for the proper monitoring of damage to the resource base and for

pollution control. This latter need will be discussed under the pollution and waste management strategies (Chapter 6).

Regarding basic data on the status of key resources, there are various efforts under way to collect technical information, particularly on marine aspects, which should be part of any attempt at establishing an information database.

For the immediate future, efforts need to be directed at establishing a national Resource Information System and database, with the collation of existing scientific data as the first step. Then, as part of capacity building, there should also be some training in systems use and database updating.

Programme 3.2.1
Resource Information System development

Aim and scope
To develop and establish a computer based, user-friendly Resource Information System, including establishment of an information retrieval network and training in system use.

Issue 3.3
Unsustainable development practices

General

As mentioned before, the most significant cultural resource of Kiribati lies in what could be called the I-Kiribati conservation ethic which has ensured a sustainable way of life on atoll environments for thousands of years. Examples of such traditional practices included extensive composting, secrecy about fishing grounds, restrictions on the consumption of certain species (for example, some species such as turtles or giant clams were reserved for chiefs or priests), fines or penalties for resource abuses, and clan tenure or limited access to reef and lagoon areas. Unfortunately, the old ways are being placed under pressure by environmentally disruptive resource-use practices.

Mention has been made of the dilemma faced by the Kiribati government: the need to maximise resource use in order to meet the increasing aspirations of the people versus the need to adopt more conservation measures to ensure resource renewal. However, a clear consensus has emerged for the need to ensure sustainable use of resources which, when translated into action strategies, means the adoption of more sustainable practices, including

'Te bwabwai', Cyrtosperma chamissonis. The giant swamp taro is cultivated extensively for its edible root. (photo: Cait Wait)

some of those which I-Kiribati have used for generations.

Ensuring greater sustainability

Suggestions have already been made for the documentation of traditional resource-use practices and for integrating them into new environmental legislation (see Programme 1.3.1) and educational programmes (see Programme 2.2.1). The adoption of EIA and resource pricing in national accounts, which have been discussed and recommended already (see Programme 1.2.1 and Strategy 1.5), will also ensure more sustainable development practices. Indeed, as previously indicated, this whole strategy document is premised on the need to promote a more sustainable form of development in Kiribati.

Issue 3.4
Agricultural quarantine

The fauna and flora of Kiribati have already been severely modified by the impact of human settlement and the introduction of exotic plants and animals. One of the constraints to development growth in Kiribati is the limited level of agricultural production. Although this is to be expected due to the lack of land and poor soils, it is also recognised

that pests and diseases introduced into Kiribati through exotic plants and animals are a contributing factor.

The impact on indigenous plants, most of which are of high cultural, social and ecological value, has been worsened by the introduction of new pests and diseases. If Kiribati is to prevent the further introduction of damaging exotic insect pests and diseases of plants and animals, then it needs to improve the level of quarantine protection.

Programme 3.4.1
Strengthening agricultural quarantine

Aim and scope
To improve the level of quarantine protection in Kiribati against the introduction of damaging exotic insect pests and diseases of plants and animals.

Issue 3.5
Energy conservation

Given the enormous costs to the government and public of imported oil, there is a need to conserve fossil fuel for electricity generation through the greater use of alternative renewable forms of energy, particularly solar. In fact, the extent to which Kiribati is dependent on imported fossil fuel is one of the major constraints to the efforts to forge a more sustainable development path. It will remain a constraint until Kiribati reduces its dependence on such an energy source. Kiribati may be too small to make any significant impact on international phenomena such as global warming and sea-level rise. However, given the magnitude of the problem and Kiribati's own unenviable position as a low-lying atoll country, anything it can do to reduce the burning of fossil fuel will help.

Programme 3.5.1 Pilot trial of hybrid power generation for small communities

Aim and scope
To investigate ways of reducing dependence on imported diesel, particularly in the outer islands, through a pilot study of hybrid diesel/photoelectric power generation systems at a series of test sites in the Gilbert Group.

5.3 Key physical resources relating to Objective 3

Apart from these general resource-base issues, there is also a need to promote the sustainable development of each of the key physical resources. For the purpose of this report, these resources in Kiribati are categorised according to whether they are terrestrial or marine.

5.3.1 Terrestrial resources

The terrestrial resources of Kiribati are limited and fragile, land being the scarcest of them all. The key resources to be discussed here are soils and minerals, water, flora and fauna.

Soils and minerals

Soils

As discussed in Chapter 2, Kiribati soils are quite limited, young and of low fertility, and cannot support the scale of agricultural production that is possible in other Pacific islands. Limited though this resource is, it has nevertheless sustained the I-Kiribati people for over 3,000 years. They have been able to develop, on these limited soils, a sophisticated subsistence agriculture based on coconut, breadfruit, pandanus, native fig and cultivation of giant swamp taro ('te bwabwai') in pits dug through to the fresh-water lens and mulched and fertilised with leaves of highly salt-tolerant coastal plants.

Today, unfortunately, the traditional, laborious, but effective techniques of mulching pit-grown taro and other staples are practised less and less in urban areas as society becomes more entrenched in the cash economy. However, if the soils are to sustain the I-Kiribati into the future, care must be taken to protect and enhance them instead of destroying them. Suggestions have already been made to document and incorporate some of the traditional land use practices into modern land use management. Educational programmes (see Chapter 4) may result in a more constructive attitude towards the care of the soils. Also, the protection of the coast from erosion and sea sprays (see Programme 3.1.1) and the conservation of protective stands of coastal plants and habitats including mangroves (see Programme 3.6.3) will serve to protect and enhance this limited resource if they are implemented successfully.

'Te katiru', Ixora casei, is commonly found in household gardens. (photo: Cait Wait)

Minerals

The mineral resources including sand, coral, gravel, limestone, phosphate rock, guano deposits, and deep-seabed polymetallic manganese nodules and cobalt-rich crusts are more plentiful but not extensive. The phosphate on Banaba has been exhausted and although secondary mining may be a possibility, it will not have any significant impact on the national economy. The seabed minerals are not likely to be economically viable within the next fifty years. The minerals of most significance at present are sand and gravel, which are being used for construction of houses, public buildings, roads, bridges, causeways and airports.

The practice of sand mining, however, together with other poor management practices (incorrect use of sea walls, the cutting of trees along the shorelines, and even the construction of causeways), is now of major concern. In fact, although abundant, sand, coral, gravel and limestone rock for construction and reclamation purposes are often obtained at considerable environmental costs.

In the case of sand mining and the use of dead and living coral from lagoons and fringing reefs, their removal can lead to accelerated coastal erosion and considerable loss of land. In the case of the use of coral, often for sea wall construction, there is considerable disturbance of marine habitats and an associated loss of fisheries resources.

The damage could be minimised if these materials were excavated in an appropriate manner, although the limited and fragile nature of land in Kiribati makes it difficult to excavate without any significant impact. The application of EIA procedures (see Programme 1.2.1) and the adoption of resource pricing in national accounts (see Strategy 1.5) are two of the policy measures that have been suggested which will help stop disruptive mining practices.

Water

There has been increasing concern that there is an excessive dependence on bores and wells for supply of drinking water. The sustainable yield of Tarawa's fresh-water lenses is limited due to the amount of rainwater that can be stored, the percentage of rainfall that becomes fresh water, and the amount of rainfall within a particular period. Estimates of sustainable yield for Tarawa are: Bonriki water supply area, 1000 m^3/day; and Buota water supply area, 300 m^3/day. Teaoraereke water supply area has the potential to supply 100 m^3/day but a breakdown in negotiations between the landowners and the government over the matter of land use has resulted in its removal from the water supply system.

Fresh-water lenses exist at Betio, Bairiki and Bikenibeu but these have been withdrawn from use due to faecal contamination from human and animal waste. Unless stringent land planning measures are implemented to define areas of human settlement (see Programme 5.2.1), the encroachment of villages onto water reserves will continue to contaminate the water supply.

The strategies for mitigative and adaptive planning against sea-level rise (see Programme 3.1.1) and for pollution/waste control (see Chapter 6) will help protect water quality if implemented successfully. So will the application of EIA procedures (see Programme 1.2.1) and the adoption of resource pricing in national accounts (see Strategy 1.5).

The other side of the problem is that there is a lack of conservation and use of rainwater. Closer attention to rainwater catchment and storage in South Tarawa would reduce the reliance on water supplied by the Public Utilities Board and the

Ministry of Works and Energy. But since there seems to be some preference for groundwater in the mixing of toddy, there is a need to address such cultural and/or social aspects of the problem. Many well intended development projects in the Pacific have faltered simply because of the failure to consider the cultural and social preferences of the recipients.

Programme 3.6.1*
Rainwater conservation

Aim and scope

To promote maximum conservation of rainwater in Kiribati, particularly the dry southern islands of the Gilbert Group, by means of: (a) construction of rainwater catchments, surface and underground storage on all major government buildings with large roof areas in South Tarawa; (b) an expansion of the household rainwater catchment programme by constructing further water catchments and increased water storage capacity; (c) support for similar construction of community storage on public buildings including churches and meeting halls; (d) the review of the enforcement of legal provisions requiring all new buildings to have approved rainwater storage constructed; and (e)reactivating previous public education campaigns against water wastage.

* For continuity in the numbering of programmes relating to Objective 3, this and the remaining programmes are numbered from 3.6.1.

Flora and fauna

Although highly disturbed and in some ways enriched by introduced exotics, the vegetation and flora of Kiribati constitute a critical ecological and cultural resource and a basis for sustainable development. This is particularly true of the indigenous species, virtually all of which have wide cultural utility within the subsistence economy and constitute real income which cannot be replaced, or would be extremely expensive to replace with imported substitutes. The most important functions of the vegetation and flora include the provision of shade and animal and plant habitats; protection from the wind, erosion, flood and salt-water incursion; land stabilisation; protection from the desiccating effects of salt spray; soil improvement and mulching.

'Te kaina', Pandanus tectorius, is found throughout the atolls and islands of Kiribati. (photo: Cait Wait)

There is limited biological diversity in Kiribati's terrestrial flora and fauna. The one endemic terrestrial vertebrate, the Christmas Island warbler, is common at present on Kiritimati and Tabueran, but its habitat must be protected for its long-term survival, particularly in view of the fact that these two islands are expected to be the target of increased resettlement from the Gilbert Group. The insect fauna constitutes the majority of the terrestrial animals found on the atolls, and many of them are important to the functioning of atoll ecosystems.

Kiribati's bird life is relatively rich and it constitutes an important resource both to the people of Kiribati and to the world. The islands constitute the most extensive system of seabird rookeries in the world, a system which should be protected because of its important role in the oceanic ecosystem.

As well, from the point of view of sustainable development, there are critical habitats and species which need to be conserved and managed properly.

Programme 3.6.2
Protection of special habitats and species

Aim and scope
To identify those special habitats and species which need protection and establish protective or conservation regimes.

Programme 3.6.3
Conservation and management of mangroves

Aim and scope
To determine the best way of managing and developing/using the mangroves of Kiribati in a sustainable manner, and to investigate the designation of mangrove reserve areas to ensure ongoing protection.

Programme 3.6.4
Review and improve conservation arrangements for the Phoenix Group and Line Islands

Aim and scope
To review the present status of the reserves and wildlife sanctuaries in the Phoenix Group and Line Islands and recommend the best ways of ensuring the protection of critical habitats and species while allowing for the requirements of human populations.

Programme 3.6.5
Establishment of an arboretum of traditional cultural and medicinal plants of Kiribati

Aim and scope
To review the feasibility of, and write a proposal for, establishing an arboretum of traditional cultural and medicinal plants of Kiribati.

5.3.2 Marine resources

Value to the I-Kiribati

The diverse marine food resources, which have helped sustain the people of Kiribati for over three thousand years, constitute a renewable subsistence and commercial resource if managed wisely. The potential sustainability of the resource is evidenced by the fact that, despite thousands of years of almost daily reef gleaning at low tide it is still possible, even in South Tarawa and other densely populated areas, for families to glean their daily protein needs from the intertidal zone and fringing reef areas.

Increasing pressures

However, the scarcity of certain marine organisms, particularly in the higher population areas, of species such as turtles, bonefish, reef cod and giant clams, the evidence of smaller catches and decreasing average size of individual species, indicate that marine resources are being subjected to increasing pressures.

Of perhaps greater concern is that increasing commercialisation of many of these species (such as tuna, baitfish, giant clams) and a wide range of other finfish and crustaceans has put increasing pressure on these resources, thus underlining the need for protective legislation and sustainable utilisation/production strategies.

As noted above, the conservation ethic remains strong among most of Kiribati's rural peoples and the wide range of conservation practices still in use indicates that I-Kiribati traditionally attempted to manage their marine resources on a sustainable basis. Unfortunately, this conservation ethic, including the principle of limited access and some of the other marine resource management mechanisms, is breaking down.

The main factors seem to be the amalgamation and relocation of settlements during the early 1800s, increased use of motorised boats capable of fishing in the open ocean, and increased emphasis on commercial fishing, modern education and development along Western lines. In 1951, for example, the people of Onotoa agreed to abolish traditional tenure arrangements and declared the lagoon public domain, thus allowing for indiscriminate fishing.

Need for conservation efforts

The marine fauna is comparatively rich, constituting a strategic resource: it is in fact, the *sole* basis for sustainable economic development. The diverse marine resources have helped sustain the people of Kiribati for over three thousand years and could remain renewable if managed wisely. There are current efforts to find out more about the status of certain marine species, and a proper strategy for

the sustainable management of marine resources therefore could only be drawn on the basis of collaboration with agencies (that is, USAID, USP and others) responsible for these various initiatives.

Incorporating traditional practices

Given the success of traditional methods of resource use in conserving marine resources, the programmes (see Programmes 1.3.1 and 2.2.1) aimed at documenting and incorporating some of these methods into modern resource management would have much relevance to a marine resource management strategy. Three of the programmes (3.6.2, 3.6.3, 3.6.4) suggested above for the conservation and sustainable development of terrestrial resources could be included under a marine resource management strategy as well.

Programme 3.6.6
Training workshops on the conservation and management of reefs and marine living resources in Kiribati

Aim and scope

To raise public awareness regarding the importance of reefs and marine living resources, and the need for conservation and effective management.

Chapter 6

Objective 4 — Improving waste management and pollution control

6.1 Introduction

One of Kiribati's major concerns is to improve the management of waste and the control of pollution, particularly in South Tarawa where about 25,000 or 35 per cent of the total population live. With such limited space and a vulnerable resource base (limited soils, narrow water lens, well used lagoons and exposed foreshores), there is concern that if nothing is done to ensure proper disposal of solid waste and sewage, degradation of the environment will become of critical concern.

Already, many of the community health problems now evident in South Tarawa are attributable to a great extent to the contamination of water supplies and water shortages. Despite efforts to keep it clean, some sections of the Tarawa lagoon are still contaminated. This is due, in part, to people continuing to use the beach for defecation rather than the toilet blocks which were constructed to discourage the practice but which are inadequately maintained and frequently blocked. A salt-water sewerage system is in operation, but there are too few connections to the system by private owners, too many leakages, and too much discharge of sullage onto the ground.

Solid waste disposal is a major concern, given the susceptibility of groundwater and marine resources to pollution. There is uncertainty regarding the availability of land for safe landfill sites; a lack of disposal facilities for hazardous waste; increasing use of imported non-biodegradable products and packaging; a lack of information on the nature and origin of waste and its environmental impacts; and a lack of legislation controlling toxic and non-biodegradable waste. Kiribati is concerned at the use of neighbouring islands and oceanic areas within the Pacific as waste disposal/reduction sites.

Through regional fora such as the South Pacific Forum, Kiribati, along with other Pacific nations, expresses concern at the transport of radioactive material through the waters of the Pacific.

6.2 Specific strategies to achieve Objective 4

A waste management and pollution control objective (Objective 4) should include the whole of Kiribati. But since the major pollution problems occur in South Tarawa, that is where the major focus will be, at least initially. The objective will be addressed through four major strategies, although many of the strategies and programmes which have already been suggested are also applicable here.

The specific strategies proposed to address Objective 4 are as follows.

- Strategy 4.1 — Improved management and disposal of solid waste and sewage
- Strategy 4.2 — Control of hazardous chemicals
- Strategy 4.3 — Control of marine pollution
- Strategy 4.4 — Commitment to international pollution control

These strategies and the programmes associated with them are elaborated below.

Strategy 4.1 Improved management and disposal of solid waste and sewage

General

The disposal of solid waste in Kiribati is an obvious challenge because of the shortage of land — thus

the need to focus on ways and means of controlling the importation of non-biodegradable materials.

The disposal of sewage is also problematic because of the lack of land and the vulnerability of water lenses. In the more densely populated areas of South Tarawa, the focus would be directed to better maintenance of the salt-water sewerage systems and connection of more toilet facilities to the system.

In the more rural parts of both South Tarawa and the outer islands, the focus would be on the introduction of bio-toilet systems, particularly the new systems of biofilter sewage treatment which have proven successful elsewhere. The first step would be to conduct pilot trials of alternative bio-toilet systems at selected centres on South Tarawa. The prospect of using the fully treated sludge by-product of the systems for garden fertiliser would also be explored.

Particular elements

This strategy would therefore focus on the following elements.

(1) Improve sewage disposal systems in South Tarawa in an environmentally beneficial way:
— bio-toilet/biofilter sewage treatment
— sewage pumps and treatment
— improved maintenance for, and increased connections to, the salt-water sewerage systems.

(2) Strengthen the household health inspection system.

(3) Improve management and disposal of solid wastes on South Tarawa:
— waste management training/education programme
— control on the importation of non-biodegradable materials.

Programme 4.1.1
Pilot study in alternative sanitation technology

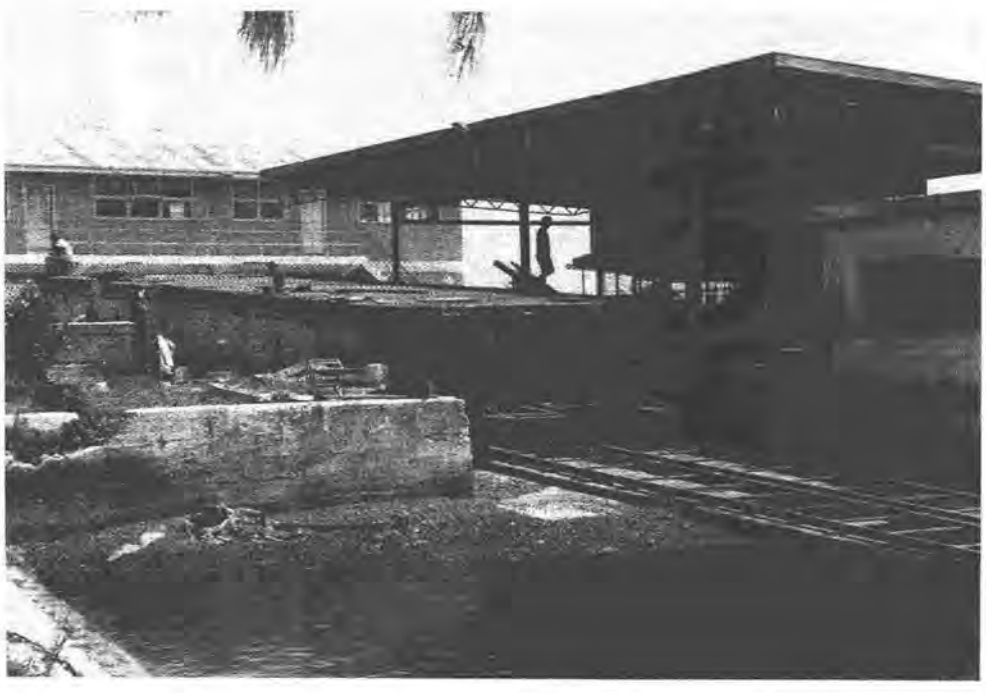
Aim and scope

To improve sewage disposal systems in an environmentally safe way, and thereby improve human health.

Programme 4.1.2
Review current sewage disposal systems

Aim and scope

To assess the condition of the salt-water sewerage system in South Tarawa to determine its capacity for more connections; its impact on public health and the environment; and its maintenance requirements.



Sediments contaminated by hydrocarbon discharge adjacent to Betio slipway. (photo: Craig Wilson)

Programme 4.1.3
Preparation of a solid waste management and disposal programme

Aim and scope
To determine the best ways of managing the disposal of solid waste including the reduction of waste stream, particularly that of a non-biodegradable nature.

Strategy 4.2
Control of hazardous chemicals

The programme for improved solid waste disposal suggested above would include efforts to control the disposal of hazardous chemicals. Given the problems of limited space and the vulnerability of Kiribati's ecosystems, there is also a need to control the supply of such materials, perhaps by tightening the application of regulations on the importation, storage and use of hazardous chemicals. The system of importation control and licensing of vendors of toxic chemicals should be reviewed, either as part of the solid waste management programme (see Programme 4.1.3) or as part of the overall effort to review and improve policy and administrative instruments for environmental management (see Chapter 3).

Another equally important aspect of controlling chemical pollution is the regular monitoring of food being sold in the markets and stores, and of water for chemical residues. Neither the existing laboratory facilities nor the available technical expertise are adequate for such a task, so there is a need to investigate ways of providing Kiribati with an independent capacity to carry out such tests. It is important that the costs of setting up a national laboratory are considered carefully and weighed against the costs and benefits of sending samples overseas for analysis.

Programme 4.2.1
National laboratory: feasibility study

Aim and scope
To determine the feasibility of making Kiribati independent for the conduct of chemical analysis of water and of imported and locally produced foodstuffs, to protect the public against the misuse of pesticides and other toxic chemicals.

Strategy 4.3
Control of marine pollution

The sinking in May 1993 of a United States purse seine tuna boat approximately 95 nautical miles to the west of Abaiang highlighted the ever increasing risk of a major oil spill occurring and the need, therefore, for marine and port staff to maintain some sort of readiness to deal with such emergencies. Marine resources represent the only real basis for sustainable development in Kiribati, so their protection from any and all sorts of pollution is vital.

While Kiribati is acutely conscious of the pollution risks associated with possible spills of petrol, oil and lubricant and has been involved in the development of contingency plans for pollution emergencies, Kiribati marine and port staff need to be better prepared through small dummy runs to practise the application of the contingency plans. Kiribati also needs to maintain a level of basic equipment and disbursement chemicals which would permit it to take early action to counter spills at critical sites before further assistance from outside could be brought to bear.

Programme 4.3.1
Implementation of the contingency plan to counter marine pollution

Aim and scope
To determine and acquire the type of equipment that would be required to combat the type of marine emergencies most likely experienced in Kiribati waters; to determine the most appropriate training courses to ensure that the operation of such equipment was being carried out according to specification; and to determine sources of funds for the purchase of equipment.

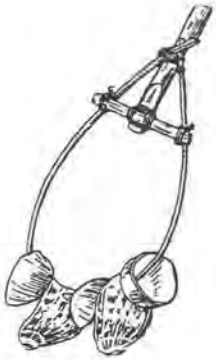
Strategy 4.4
Commitment to international pollution control

Some of the major pollution risks faced by Kiribati originate from foreign countries (that is, ozone-depleting gases and global warming; and nuclear testing/dumping and other toxic waste dumping). The Kiribati government is taking action through the development of international agreements and fora. In fact, it could be said that Kiribati is already

doing all it can do by keeping the issues alive in the international fora. Perhaps the best strategy is for Kiribati to continue its active involvement in international fora and agreements to try to minimise the possibility of pumping/dumping more hazardous gases and materials into the atmosphere and the ocean.

In regard to international pollution control, Kiribati has signed or acceded to the following conventions.

- *South Pacific Nuclear Free Zone Treaty , 1985* (Rarotonga Treaty)
- *Nuclear Non-proliferation Treaty, 1968*
- *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* (London Dumping Convention)
- *Convention for the Protection of the Ozone Layer, 1985*, Vienna
- *United Nations Convention on Climate Change, 1992*, Rio de Janeiro



Chapter 7

Objective 5 — Balanced development, planned urbanisation and lower population growth rates

7.1 Introduction

As noted above, Kiribati has a high rate of population growth (2.4 per cent annually) which if not checked will result in the doubling of the population in 35 years. There is also gross imbalance in distribution of the population, with more than 90 per cent living in the Gilbert Group and one third of the total population located on the tiny islets of South Tarawa.

The problems associated with such a large and unevenly distributed population in a country like Kiribati are enormous, given the very limited land resource base. The population on the islets of South Tarawa has long exceeded the natural carrying capacity of the area and is putting severe pressure on government resources. Overpopulation in South Tarawa has contributed to:

- groundwater depletion and pollution;
- overfishing of reefs and lagoons, and unsustainable rates of gleaning of intertidal reef flats;
- problems of garbage and sewage disposal;
- coastal erosion arising from extraction of sand and aggregate for construction, and from inadequate design of causeways between islets; and
- shortage of firewood.

But perhaps the most important consequence of high population densities has been poor health, as indicated by high infant mortality rates and low life expectancy. There is also high incidence of nutrition-related, non-communicable diseases.

7.2 Government response

The government recognises the problems and has responded with two far-sighted policies. It is giving high priority to family planning and rural development; and it is actively encouraging the resettlement of families from South Tarawa and other areas of the Gilbert Group to the Northern Line Islands. There is some concern, however, at the pressure on the resource base and biodiversity of the Northern Line Islands, so it is important to proceed with the resettlement programme with utmost care and attention to maintaining an ecological balance.

As the problems of overpopulation and uncontrolled urbanisation are most acute in South Tarawa, that is where the focus of remedial action will be. South Tarawa has the highest population density and shows evidence of water depletion and pollution, overfishing of reefs and lagoons, unsustainable rates of gleaning of intertidal reef flats, garbage and sewage problems, shortage of firewood etc.

However, the problems in South Tarawa are part of a larger (national) scene. It could be suggested, for example, that one of the immediate causes lies in the recent movement of people from outer islands to South Tarawa. To address such problems effectively, therefore, the strategy should continue its emphasis on the economic development of outer islands and the provision of other incentives for people to remain on their home islands.

Strategies for achieving a population/urbanisation objective (Objective 5) would include one on the development of a national population policy, one to promote balanced (more decentralised) development, and another to improve the control of urbanisation. These are all interrelated and must be implemented as part of the same overall objective.

7.3 Specific strategies to achieve Objective 5

Strategy 5.1
Population policy

The government has clearly recognised the problems associated with rapid population growth and has formalised its intention of reducing the growth rate to 2.2 per cent by 1995 and to 2.0 per cent by 2000 (Republic of Kiribati 1993). The government's long-term aim is to create awareness of the benefits of small families and promote family planning methods so that the fertility rate will be reduced to a level where the population growth rate will ultimately reach zero.

What is needed as a matter of priority is to develop and implement a national population policy to guide programmes and activities aimed at achieving the stated targets for population growth. This is being done through the Ministry of Health, Family Planning and Social Welfare. One of the most important functions of a national population policy is to ensure the integration of population issues into environmental planning and management. A national population policy should include realistic goals (population growth rates etc.), a time frame, and resource provisions for achieving the goals.

Programme 5.1.1
Population policy development

Aim and scope
To develop, refine and implement the population policy for Kiribati.

Strategy 5.2
Planned urbanisation and balanced development

In South Tarawa, another focus of the strategy should be on planning for and controlling the spread of urbanisation. This tool is available to the government but there are constraints regarding commitment and capacity that need to be addressed before urban planning could become a positive force. The priority now is to agree on and apply minimum standards or benchmarks for development in land, housing, water, and sewage/waste disposal.

View of South Tarawa. (photo: Simon Diffey)

There is also a need to strengthen those agencies charged with urban management through clearer policy directives and greater resources. Unless these are in place, no new major development should be considered for South Tarawa. Instead, options on outer islands need to be considered: certainly, strong support should be given to decentralisation of junior secondary schools and other essential services (health and communications) to outer islands.

It is assumed that one of the major reasons for the attraction to South Tarawa of people from the outer islands is the concentration of modern development programmes and greater opportunities. It is further assumed that in order to reduce population growth rates in South Tarawa, there is a need to convince the populations of the outer islands that they would be better off staying in or returning to their home islands. A more even spread of development opportunities throughout Kiribati will result in a more even distribution of the population, or at least one that is more reflective of the actual

carrying capacities of the different groups and islands.

The government has already started on this by improving the incentives for people to resettle in the Northern Line Islands. A special development plan exists for the Line Islands and the Phoenix Group (AGRICO 1993) and this should be considered seriously for implementation. Some external assistance could provide the impetus but the Kiribati government is certainly capable of taking the initiative to promote more balanced development and, in fact, has already started to do so.

A programme or project aimed at a more equitable distribution of development initiatives and benefits could have the following features:

(1) it would be based on the ecological carrying capacity of the islands (that is, to accommodate people and their social/cultural desires, and development initiatives) rather than being dictated by the present location of government and infrastructure; and

(2) it would aim at carefully selecting growth centres (perhaps one or two) within each of the three main groups for initial support.

However, care must be taken not to degrade the environment of the outer island groups in the name of development. The resettlement programme for the Northern Line Islands provides a practical opportunity to devise a means of balancing the need to resettle many people away from South Tarawa and promote development in the target islands with the natural carrying capacities of their ecosystems.

A programme or project to simply limit or curtail the movement of people from outer islands to South Tarawa could look at other (that is, legal/administrative) tools as well. However, in the absence of appropriate social and economic incentives, this latter set of policy tools is not likely to have much success in Kiribati. They have not been successful anywhere else on their own.

Programme 5.2.1
Planned urbanisation and balanced development

Aim and scope

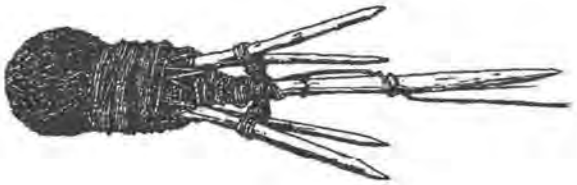
(a) To establish minimum standards or benchmarks for development of land, housing, water, and sewage/waste disposal in South Tarawa, and to strengthen the capacity of those agencies charged with urban management through clearer policy directives and greater resources.

(b) To understand the dynamic nature of the forces controlling the development of South Tarawa and the outer islands of the Gilbert Group.

(c) To assess to what extent the dynamics outlined above can be modified or enhanced to achieve the objectives of balanced development.

Chapter 8

Implementation



8.1 NEMS Task Force on implementation

The first step is to formally establish a Task Force to guide implementation. Without the will and commitment needed for its implementation, the National Environmental Management Strategy is pointless. Hence, the selection of a core team who will oversee its implementation, marshall necessary resources, coordinate activities and spread the message of commitment to the sustainable development principle will be a necessary requirement.

At the request of SPREP, the preparation of the UNCED country report and the State of the Environment Report (SOE) was guided by a national task force set up for the purpose. Since then, the Government of Kiribati has formally established the Kiribati Task Force on the Environment (KTFE) to consider policy guidelines on environmental matters. This body has overseen the development of the NEMS and will probably oversee its implementation as well.

The KTFE has membership drawn from the Public Works Division; Lands and Survey Division; Marine and Tourism Divisions (of MTCT); National Planning Office; Agriculture and Fisheries Divisions and the Environment Unit (of MENRD); Curriculum Development Research Centre (of MEST); the Ministry of Health, Family Planning and Social Welfare; as well as from non-government organisations like Aia Maea Ainen Kiribati (AMAK) (the national women's group), and the National Council of Churches. There may be a need to ensure that there is effective participation by NGOs and other community representatives. The KTFE may also co-opt other members for specialist advice as required.

The KTFE has been divided up into smaller operational committees to focus on separate action strategies of the NEMS which means that it will be more operational and effective. The KTFE could have an advisory role to Cabinet and could continue reporting to the Minister for Environment and Natural Resources Development. One of the most important functions of the KTFE is to ensure that funding is sought through the KTFE Secretariat (Environment Unit) in time for proposed implementation, and to ensure that review of progress of the NEMS takes place regularly.

8.2 NEMS implications

The draft NEMS document was reviewed by the KTFE before it was finalised for Cabinet endorsement. In reviewing the NEMS draft, the KTFE prioritised strategies for action for immediate consideration by government and donors. As all the strategies have programmes attached to them for implementation, the KTFE prioritised the strategies by assigning priorities to each of these programmes.

In the absence of clear environmental policies, the prioritisation of strategies and programmes by the KTFE amounts to policy guidance, and endorsement by the Cabinet means official acceptance of such advice. Given the time needed for policy development, this process of gaining government endorsement was seen as the most realistic way of advancing the cause of environmental management and sustainable development in Kiribati. As proper policies are developed, there will be some inevitable changes to the way the strategies are implemented.

PART 3
Programme profiles

Detailed programme profiles

Contents list

Note All currency amounts are in United States dollars ($US).

Programme profile 1.2.1

Development and application of standard EIA guidelines

Background

One of the most powerful policy tools available for the control of the impact of human activities on the environment is Environmental Impact Assessment (EIA). In the case of Kiribati, however, current legislation does not make mandatory any EIA procedures, and mandatory EIA procedures are not applied when determining the viability of development projects. In the current process of project development, environmental issues are outlined by the proponent for consideration by the Planning Unit, then the advice of the Environment Unit is requested.

Aim and scope

To develop a set of standard EIA guidelines to be accompanied by detailed administrative procedures for their implementation, and training of responsible officers in EIA.

Description

Guidelines would be prepared for the application of the EIA process to all government and private sector development proposals. The preparation of these guidelines requires technical assistance (a technical expert) for a one-month consultation, with a further month to prepare and trial proposed administrative procedures and conduct training.

Cost estimates

Technical experts—2 months	20,000
Travel and accommodation	10,000
Publication/dissemination of EIA guidelines/procedures	2,000
Training in EIA	10,000
Total costs	**$US 42,000**

The programme could be implemented quickly if funds could be secured. The South Pacific Regional Environment Programme (SPREP) has already offered assistance in development of EIA guidelines and in training. Depending on use of SPREP's in-house technical expertise, the estimated cost could be reduced.

Executing agency

The Ministry of Environment and Natural Resources Development (MENRD), in close consultation with the Ministry of Finance and Economic Planning (MFEP), and the Ministry of Home Affairs and Rural Development (MHARD).

In-kind support

MENRD will provide a national counterpart and logistical support, while MFEP will provide the service of a senior economic planner to assist the EIA consultants.

Duration

2 months

Programme profile 1.3.1

Research/review of resource-use customs and traditions

Background

It is widely accepted that over the past 3,000 years, the I-Kiribati have evolved customs and traditions which have been effective in ensuring sustainability in living on atolls. These customs and traditions on land use and fishing have proven effective in conserving resources and ensuring their sustainable use.

More importantly, from the point of view of environmental legislation and enforcement, these traditions and customs have been so much part of the atoll way of life and norms that they are more likely to engender compliance than a well-meaning but alien piece of legislation. Some of these customs and traditions have already been incorporated with success in some Kiribati by-laws, like the Local Government Act 1984, which has proven to be quite an important instrument for environmental management and protection.

The environmental legislation review carried out as part of the NEMS process (Pulea & Farrier 1994) has pointed out that there is more potential in the area of custom law than has previously been appreciated and used, and that there is a need to identify and incorporate more of the I-Kiribati resource-use customs and traditions in a new umbrella Environment Act.

Aim and scope

To research and identify those aspects of I-Kiribati customs and traditions of resource use which could be incorporated into the proposed Environment Act.

Description

The research could be carried out by a legal consultant with interest in and experience of Pacific Island customs and traditions on resource use. Preferably, this same person would go on to draft the Environment Act for Kiribati. If not, then the researcher could be a postgraduate research student or an I-Kiribati graduate, but would need to work very closely with the Environment Act consultant. The research would require two months consultation throughout Kiribati, with some assistance from local experts on the subject matter.

Cost estimates

Researcher—2 months	10,000
Travel and accommodation	10,000
Total costs	**$US 20,000**

If the research is carried out by the same person drafting the Environment Act, then the costs could be reduced as he/she could be doing both at the same time. However, if not, it would be more cost-effective to give a research grant to a postgraduate student doing thesis work or an I-Kiribati graduate interested in pursuing postgraduate studies in the subject area.

Executing agency

The Attorney-General's Chambers in close collaboration with the Ministry of Home Affairs and Rural Development (MHARD) and the Ministry of Environment and Natural Resources Development (MENRD).

In-kind support	The Attorney-General's Chambers and MHARD will provide counterpart support and MENRD will provide logistics support.
Duration	2 months

Programme profile 1.3.2

Prepare and guide development of the national Environment Act

Background

There is no one comprehensive piece of environment legislation for Kiribati although there are a number of existing ordinances dealing with various aspects of the environment. Some of these ordinances could be quite useful if and when enforced. However, in general, there is a need to update them and integrate their environmental regulatory content into national umbrella legislation on the environment. Indeed, the development of specific environmental legislation is seen as an urgent priority.

Aim and scope

To build on the results of Programme profile 1.3.1, draft an Environment Act and associated administrative policies and structure, and guide it through the process of ratification. Socially acceptable and culturally sensitive penalties for breaches of the Environment Act provisions should also be determined as part of the project.

Description

The Environment Act would be drafted based on the environmental legislation review undertaken as part of the NEMS process (Pulea & Farrier 1994). The results of the research programmes on resource-use customs and traditions (see Programme profiles 1.3.1 and 2.2.1) will provide an important input into the drafting exercise. The work will be carried out in consultation with both the national government and the local island councils and will take three months. It is important to get the service of a lawyer who is familiar with, and appreciative of, the role of customs and traditions in Kiribati.

Cost estimates

Legal draftsperson—3 months	30,000
Travel and accommodation	15,000
Workshops	5,000
Printing costs	5,000
Total costs	**$US 55,000**

Executing agency

The Attorney-General's Chambers in close collaboration with the Ministry of Home Affairs and Rural Development (MHARD) and the Ministry of Environment and Natural Resources Development (MENRD).

In-kind support

The Attorney-General's Chambers will provide a national counterpart and either MHARD or MENRD will provide logistical support.

Duration

3 months

Programme profile 2.1.1

Establishment of an environmental education and information section within the Environment Unit of the Ministry of Environment and Natural Resources Development (MENRD)

Background

Environmental education is considered a critical factor in addressing the current environmental problems and preventing future ones. Making people aware of the impact of their everyday actions and giving them a capacity to change the way they do things would be a major achievement in environmental protection. Unfortunately, there is a lack of educational and informative materials pertinent to Kiribati. Some efforts are under way to address this problem within the formal education sector but more needs to be done, especially in non-formal education.

More importantly, there is a need for a focal point within Kiribati to push for and coordinate the production and use of such educational materials; this includes resource persons. Reliance on short-term consultancies to provide such information and service allows little chance for skills transfer to I-Kiribati, and results in an ongoing need for short-term consultancies to address information needs.

Aim and scope

To establish an environmental education and information section within the Environment Unit of MENRD for the production and dissemination of resources and environmental information, and to coordinate environmental awareness campaigns under other proposed programmes in this strategy document.

Description

The establishment of such an education section would require the recruitment of a technical expert for two years to initiate the process and train a national counterpart. The national counterpart could undergo further specialised training in environmental education and production of relevant materials at an overseas institution, perhaps during the second year of the project, returning to take over from the expert.

Initially, the project will locate and supplement resource information for education and public awareness campaigns and coordinate environmental materials for other ministries. The focus will then shift to providing quality audio-visuals, fact sheets, information in poster form, leaflets, newsletters and radio programmes for a variety of end-users such as schools, government ministries, NGOs and community groups.

The project will also pay attention to the further identification of information needs and liaison and coordination with other extension programmes, particularly agriculture and fisheries. Special effort will be made to incorporate traditional knowledge (see Programme profile 2.2.1) in the development of educative materials and other resources for environmental awareness.

Cost estimates

Technical assistance—2 years	20,000
Equipment for information production (VCR, cameras, desktop publishing capabilities)	15,000
Training	15,000
Office equipment and support	5,000
Printing/production of environmental information	20,000
Total costs	**$US 75,000**

The costing for the expert is based on the rate for an Australian or New Zealand volunteer in Kiribati.

Executing agency

The Ministry of Environment and Natural Resources Development (MENRD) in close collaboration with the Ministry of Education, Science and Technology (MEST).

In-kind support

MENRD would provide the national counterpart (Education Officer), logistical and other office support.

Duration

2 years

Programme profile 2.1.2

Environmental awareness workshops

Background

The need for greater environmental awareness could be further addressed through a series of community workshops. As well, throughout the NEMS process in Kiribati, the need for a 'bottom up' approach to environmental planning and management was stressed, something which is further highlighted in the State of the Environment Report for Kiribati (Wilson 1994).

Environmental awareness workshops can address the two issues simultaneously: improve the environmental awareness of participants; and allow for their participation in the discussion of local issues, formulation of strategies and, ultimately, direction of policy.

Aim and scope

To promote environmental awareness throughout Kiribati and to engender grass-roots participation in environmental planning and management.

Description

Given their contact with the communities, the NGOs including church groups and the councils would play the key role in organising environmental awareness workshops, with the Ministry of Environment and Natural Resources Development (MENRD) and other government ministries providing support where appropriate. These workshops need to reach as wide an audience as possible and should include outer islands.

Some community groups should also be used in the organisation and running of workshops but, like NGOs and island councils, they need some prior training. An important component of the project, therefore, is training for those groups that will be involved in organising and running workshops. Such groups include island councils, island development committees, village women's groups, youth groups, island community workers etc.

The training workshops should run over two years, aiming to cover major population areas within each of the three main groups — the Gilbert and Phoenix Groups, and the Line Islands — within the first year. Special effort will be made to incorporate traditional knowledge (see Programme profile 2.2.1) into the workshop materials.

Cost estimates

Internal travel and accommodation (for resource persons)	20,000
Tarawa workshops (10 at $2,000 each)	20,000
Outer islands workshops (10 at $2,500 each)	25,000
Total costs	**$US 65,000**

Executing agency

The Environment Unit, Ministry of Environment and Natural Resources Development (MENRD), in close consultation with the Ministry of Home Affairs and Rural Development (MHARD) and the Ministry of Education, Science and Technology (MEST). There will be close collaboration with implementing agencies including island councils, NGOs, churches, and some community groups.

In-kind support	MENRD will provide a national counterpart to coordinate the workshops as well as resource persons, workshop materials and logistical support. Other ministries (MHARD, MEST and Ministry of Health, Family Planning and Social Welfare) will provide resource persons.
Duration	2 years

Programme profile 2.1.3

Development of environmental fact sheets, educational resources and audio-visual aids, and alternative media for awareness campaigns

Background

As mentioned under Programme profile 2.1.1, perhaps the most critical area of need in terms of educative materials is in non-formal education. Non-government organisations, church groups and community groups are expected to participate in running environmental awareness workshops.

Unfortunately, little is known about what these groups need by way of information and institutional assistance to permit them to deliver accurate environmental messages to rural communities in ways that can be understood. There is undoubtedly a need to develop the kinds of materials and support the type of media (plays, songs, speech competitions etc.) which NGOs and other community groups can best use, and which have proven effective in disseminating ideas through the communities.

The establishment of the proposed environmental education and information section within the Environment Unit, Ministry of Environment and Natural Resources Development (MENRD) would spearhead the efforts to produce educative materials, but the information needs of NGOs and other community groups are considered special enough to warrant a separate effort.

Aim and scope

To identify and develop environmental information resources and alternative media for the community education programmes of NGOs, churches and other groups with extensive community networks.

Description

The initial focus of the project would be to identify the environmental information needs of NGOs, churches and other groups, and appropriate media tools for delivery of messages by such groups. A number of issues which urgently need the attention of the public have been identified under each of the proposed strategies, and these should form the starting point for development of information resources. They should be further refined by awareness workshops (see Programme profiles 2.1.2 and 5.1.1) and by a special workshop convened for representatives of NGOs, church groups etc., to review and further clarify their information needs. The NGO efforts in using alternative media tools also need to be supported. Special effort will be made to integrate traditional knowledge (see Programme profile 2.2.1) into educative materials and programmes for NGOs and similar community groups.

Cost estimates

Technical assistance (NGO information needs; alternative media tools)—3 months	15,000
Workshop for needs identification	10,000
Workshop on use of community plays, songs, speeches, sports etc. in environmental education programmes	10,000
Printing and materials production	20,000
Total costs	**$US 55,000**

Executing agency	Ministry of Education, Science and Technology (MEST), Ministry of Health, Family Planning and Social Welfare (MHFP&SW) and the Environment Unit, Ministry of Environment and Natural Resources Development (MENRD), in close consultation with NGOs and church groups.
In-kind support	MEST and MENRD will provide national counterparts to coordinate the project and NGOs will provide or recruit the technical experts.
Duration	6 months

. rogramme profile 2.2.1

)ocumentation and integration of traditional knowledge and management systems into the education system

Background

Aspects of traditional knowledge and management practices which ensured sustainable living on Kiribati for thousands of years are being placed under pressure from Western land management models which, from the viewpoint of environmental sustainability, are unproven. This is particularly evident on Tarawa where the Western influence is greatest. On the outer islands this influence is less evident and traditional knowledge and values are still adhered to.

However, even where traditional resource-use and protection principles may still be adhered to, specific practices are being placed under pressure. Yet it is these which are crucial to the development of alternative management systems for today. The deterioration of traditional agricultural and subsistence systems is seen as one of the most serious constraints to sustainable development in Kiribati at present.

The education system in Kiribati should stress the importance of, and provide training on, traditional resource values and management. Thus, any effort to revive and incorporate any of the traditional resource use practices must begin with the documentation of as much of such knowledge as possible for integration into our school systems.

Aim and scope

To document traditional resource knowledge and management systems and incorporate them into the education system.

Description

The programme will:

(a) provide a new impetus to documenting traditional resource knowledge;
(b) establish a database of traditional knowledge for possible combination of traditional and imported systems, to create management systems effective in Kiribati;
(c) integrate traditional knowledge into the modern education system through the development of new curriculum materials for schools and trainee teachers;
(d) integrate traditional knowledge into the new umbrella Environment Act.

The programme would run for two years to initiate the research and documentation. Two I-Kiribati officers would be recruited to assist the technical expert in collecting and documenting information. These I-Kiribati officers would be trained in database maintenance.

In its second year, the programme would work closely with the Ministry of Environment and Natural Resources Development (MENRD), the curriculum unit of Ministry of Education, Science and Technology (MEST) and the Attorney-General's Chambers to ensure the effective integration of traditional knowledge into the Environment Act, the environmental education programmes, and agricultural/fisheries and other extension programmes.

Cost estimates

Technical assistance—2 years	100,000
Wages—2 years (2 I-Kiribati officers)	40,000
Materials and support for Cultural Division, MEST (video tapes and VCR/TV, cameras, cassettes, tape recorder)	10,000
Internal travel and accommodation	10,000
Total costs	**$US 160,000**

Executing agency

The Cultural Division of the Ministry of Education, Science and Technology in close collaboration with the Ministry of Environment and Natural Resources Development, Ministry of Home Affairs and Rural Development, and the Attorney-General's Chambers.

In-kind support

The four government ministries involved will provide one counterpart each to assist in and get training on the maintenance and incorporation of traditional knowledge into their various sector programmes. MENRD and MEST will provide logistical support.

Duration

2 years

Programme profile 3.1.1

Vulnerability assessment and coastal zone protection

Background

While the actual impact of climate change at the local level has not been assessed, the issue of global warming and sea-level rise and its possible impact on the environment is of critical concern to the government and people of Kiribati. Kiribati is voicing its concerns on the international front to make the international community realise the seriousness of the predicted sea-level rise to small, low-lying islands.

On the home front, there is felt a need to take actions to anticipate the effects of predicted sea-level rise which, as has been noted in this strategy document, can lead to an increase in coastal erosion, increased vulnerability to storm surges and wind, and increased salinity of the fresh-water lens. Preliminary work has been done to assess Kiribati's vulnerability to accelerated sea-level rise (Woodroffe & McLean 1992) and this will form the basis of further work.

Aim and scope

(a) To review work already done on Kiribati's vulnerability to projected sea-level rise, and advance it to a level where it is possible for economic and resource development planners to generate appropriate coastal zone management strategies.

(b) To institute early protection measures aganist coastal erosion through coastal vegetation establishment and rehabilitation.

The assessment of island vulnerability would include assessment of: coastal exposure to greater erosive forces and inundation of land, sea ports and airports, roads and causeways; fresh-water lenses and salt-water intrusion; and impacts on flora and fauna, agricultural production, sewage disposal, and cultural and historical sites.

Description

The vulnerability assessment component of the programme would fund the conduct by Kiribati agencies of an assessment of the potential impacts of sea-level rise on the environment as a whole. It would:

(a) review work already done in Kiribati;

(b) reassess and clarify island vulnerability to sea-level rise; and

(c) develop island protection strategies, and prioritised programmes for strategy implementation based on that assessment.

The coastal revegetation component is a practical measure which would entail expansion of nursery capacity and establishment of belts of suitable coastal species to aid both the protection of the coastal zone against erosion and the rehabilitation of eroded areas. Additional personnel to be engaged for three years include a local project coordinator for the vulnerability assessment component and five local staff for nursery production and tree establishment under an Agriculture Division (Ministry of Environment and Natural Resources Development) supervisor.

Cost estimates

Vulnerability assessment	
Project coordinator, local staff support, internal travel, cartographic assistance, liaison with European Community programme, minor equipment and materials	100,000
Coastal revegetation	
Nursery operation, plant establishment and tending	
Local staff—field staff (5) and supervisor	100,000
Nursery and planting equipment and materials	50,000
Freight and transport	30,000
Total costs	**$US 280,000**

Executing agency

The Ministry of Environment and Natural Resources Development (MENRD). Implementation of the vulnerability assessment component would be through the Environment Unit, in close consultation with the Kiribati Task Force on the Environment; with the implementation of coastal revegetation component by the Agriculture Division.

In-kind support

MENRD will provide logistical and other office support.

Duration

3 years

Programme profile 3.2.1

Resource Information System development

Background

A technical database on natural resources is vital for making correct technical decisions and is, therefore, an essential tool for formulating sound policies and programmes. There are various efforts under way to fill existing gaps in information, particularly on marine aspects.

More efforts are needed, but for the immediate future they need to be concentrated on establishing a national resource information system and database, with the collation of existing scientific/technical data as the first step before undertaking further surveys. At the moment, there is no resource information system in operation. As a result, available environmental, demographic and climatic data are not accessed through an interactive, geographic-based, Resource Information System (RIS).

Aim and scope

To develop and establish a computer based, user-friendly Resource Information System, including establishment of an information retrieval network, and training in system use.

Description

The programme will fund the development and establishment of a computer database to store essential information on Kiribati's resource base. The programme would fund a Geographic Information System (GIS) specialist for 18 months to (a) design and commission a national Resource Information System (KIRIS); and (b) train the main potential users of the KIRIS.

Cost estimates

Technical assistance—18 months	180,000
Hire of data input staff	50,000
Equipment (computer terminals and peripherals, software)	50,000
Training	10,000
Total costs	**$US 290,000**

Executing agency

The Environment Unit in close collaboration with the Agriculture and Fisheries Divisions of the Ministry of Environment and Natural Resources Development (MENRD).

In-kind support

MENRD will collate existing information before the arrival of the database expert, and provide a national counterpart to assist the latter and receive training in systems use and database updating. It will also provide logistical and other office support in cooperation with the Lands and Survey Division, Ministry of Home Affairs and Rural Development (MHARD).

Duration

2 years

Programme profile 3.4.1

Strengthening agricultural quarantine

Background

The fauna and flora of Kiribati have already been greatly modified by human settlement and the introduction of exotic plants and animals. Many of the insect pests and diseases of plants and animals which constrain agricultural production were introduced into Kiribati through plants and animals. If Kiribati is to prevent the further introduction of damaging exotic insect pests and diseases of plants and animals, then it needs to improve the level of quarantine protection.

Aim and scope

To improve the level of quarantine protection in Kiribati against the introduction of damaging exotic insect pests and diseases of plants and animals.

Description

The programme would provide technical assistance to:

(a) review existing quarantine operations;
(b) prepare animal and plant quarantine reference manual/computer software;
(c) expand quarantine staff and facilities for Kiritimati;
(d) expand training programmes for quarantine staff;
(e) improve infrastructural support such as incinerators and fumigation chambers on South Tarawa and Kiritimati; and
(f) prepare animal disease outbreak contingency plans.

Given the scope and costs of these requirements, it might be more manageable to address them in two or three discrete projects: perhaps one combining (a), (b) and (f); another addressing staffing and training, that is, (c) and (d); and a third to cater for capital development, that is, (c) and (e).

Cost estimates

Technical assistance	
Review Kiribati operations—1 month	10,000
Prepare reference manuals—3 months	30,000
Kiritimati quarantine office equipment, and facilities including boat for inspection of itinerant yachts	80,000
Construction of buildings	50,000
Procurement of equipment and materials, including fumigators and incinerators, safety gear	65,000
Training	
In-service resource materials	5,000
Training abroad for entomological and quarantine assistants	25,000
Attachments to quarantine services abroad	10,000
Animal disease contingency plans	
(Mt Macedon, Australia) training and plan preparation for quarantine veterinarian	10,000
Total costs	**$US 285,000**

Executing agency	Plant Protection and Quarantine Unit, Agriculture Division of the Ministry of Environment and Natural Resources Development (MENRD).
In-kind support	MENRD will provide counterparts and logistical support from existing resources.
Duration	2 years

Programme profile 3.5.1

Pilot trial of hybrid power generation for small communities

Background

Kiribati has already experimented with alternative sources of energy to try to reduce its reliance on imported fossil fuel. The Japanese International Cooperation Agency (JICA) funded a pilot rural solar electrification study in North Tarawa, and the installed units are now the property of the Solar Energy Company Ltd, which was established with USAID assistance in 1985.

Experience with the North Tarawa project was positive but a constraint may be the capital cost per household, which was estimated to be $A2,500. Australia, France and Japan are at the forefront of technology advances in the use of hybrid diesel/photoelectric power generation systems to supplement diesel power for larger communities, but none of these systems has yet undergone trial in Kiribati. There is also a need to compare the economics and utility of diesel generation, photoelectricity, and the diesel/photoelectric hybrid generation systems before a decision is made on how to proceed.

Aim and scope

To investigate ways of reducing dependence on imported diesel, particularly in the outer islands, through a pilot study of hybrid diesel/photoelectric power generation systems at a series of test sites in the Gilbert Group.

Description

The proposed pilot study would run for four years and include procurement of equipment, training on installation and system maintenance, and procurement of initial supply of spare parts for system backup. The programme would be in three steps:

(a) field survey to select suitable sites for the pilot study or to reconfirm the suitability of sites already chosen;
(b) selection of hybrid power systems to be used in the study, which could require travel overseas by a representative of the Energy Planning Unit of the Ministry of Works and Energy; and
(c) training on system operation and maintenance.

Cost estimates

Technical assistance—6 months spread over 4 years	60,000
Step 1: site selection	5,000
Step 2: system selection	
Travel	15,000
Procurement, installation, spare parts	150,000
Step 3: system training	30,000
Additional local staff (2 for 4 years each) for outer islands, and administrative support	80,000
Staff training for Energy Planning Unit	20,000
Total costs	**$US 360,000**

Executing agency	Energy Planning Unit, Ministry of Works and Energy (MWE), in collaboration with the Solar Energy Company Ltd.
In-kind support	MWE and the Solar Energy Company Ltd will provide counterparts to assist with the study, as well as providing logistical and other office support.
Duration	4 years

Programme profile 3.6.1

Rainwater conservation

Background

As noted in this strategy document, there has been increasing concern in Kiribati regarding excessive dependence on bores and wells for supply of drinking water. The sustainable yield of Tarawa's fresh-water lenses is limited due to the amount of rainwater that can be stored, the percentage of rainfall that becomes fresh water, and the amount of rainfall within a particular period. Rainwater must therefore be utilised fully.

There is growing concern, however, that there is a lack of conservation and use of rainwater. Closer attention to rainwater catchment and storage in South Tarawa would reduce the reliance on water supplied by the Public Utilities Board. But as there seems to be some preference for groundwater in the mixing of toddy, there is a need to address such cultural and/or social aspects of the issue. Many well-intended development projects in the Pacific have faltered simply because of the failure to consider the cultural and social preferences of the recipients.

Aim and scope

To promote maximum conservation of rainwater in Kiribati, particularly the dry southern islands of the Gilbert Group, by means of:

(a) construction of rainwater catchments, surface and underground storage on all major government buildings with large roof areas in South Tarawa;
(b) an expansion of the household rainwater catchment programme by constructing further water catchments and increased water storage capacity;
(c) support for similar construction of community storage on public buildings including churches and meeting halls;
(d) the review of the enforcement of legal provisions requiring all new buildings to have approved rainwater storage constructed; and
(e) reactivating previous public education campaigns against water wastage.

Description

The project would have three phases: (a) design; (b) construction; and (c) public education. The design phase would involve recruitment of a hydrologist to analyse daily rainfall data so that an optimum size of rainwater tank for a particular roof can be determined; the investigation of cause of leakage in ferro-cement tanks and assessment of whether leaking tanks can be sealed economically; and construction of various prototype tanks and cisterns to determine the designs most appropriate to Kiribati.

The subsequent construction phase would be undertaken on all major government buildings currently not equipped with water storage; and construction of household water storage by householders. Wherever possible, private contractors would undertake the actual construction activity under the supervision of the Public Works Division, Ministry of Works and Energy.

The third phase, public awareness campaigns, will be undertaken by the Public Works Division, Ministry of Works and Energy (MWE) in close consultation with the Ministry of Environment and Natural Resources Development (MENRD) and the Ministry of Education, Science and Technology (MEST).

Programme profile 4.1.2

Review current sewage disposal systems

Background

Sewerage systems were constructed at the three main government centres — Betio, Bairiki and Bikenibeu — to improve the level of sanitation and avoid a recurrence of the 1977 cholera epidemic. The sewerage systems, currently managed by the Public Utilities Board (PUB), were specifically developed for Tarawa, and sea water is used for flushing. The sewage is discharged at the outer edge of the reef from outfalls situated on the reef slope.

An outfall reconnaissance survey was conducted in October 1985 to establish whether there were any significant effects on public health or the marine environment from the discharge of sewage to the ocean. The survey found minimal potential risks to public health and the environment.

However, it is now eight years since the survey was conducted, and there has been an increase in the number of toilets connected to the sewerage system. There are also significant problems with leaks and blockages so that the whole system should be reassessed for efficiency and safety. More connections to the system are needed, but first the system's capacity should be determined. More importantly, an ongoing maintenance programme is needed.

Aim and scope

To assess the condition of the salt-water sewerage system in South Tarawa to determine its capacity for more connections; its impact on public health and the environment; and its maintenance requirements.

Description

The programme would fund an expert to carry out the assessment/survey and make recommendations on how to alleviate the problems. These recommendations should be in the form of a project proposal. The survey should take one month.

Cost estimates

Technical assistance—2 months	20,000
Travel and DSA	10,000
Workshop	5,000
Total costs	**$US 35,000**

Executing agency

The Public Utilities Board, Ministry of Works and Energy (MWE) in close consultation with the Ministry of Health, Family Planning and Social Welfare (MHFP&SW), the Tarawa Urban Council, and the Ministry of Home Affairs and Rural Development (MHARD).

In-kind support

MWE and MHFP&SW will provide counterparts to assist with the survey, and MWE will provide logistical and other office support.

Duration

2 months

Programme profile 4.1.3

Preparation of a solid waste management and disposal programme

Background

With limited space for landfills, the disposal of solid waste has become a major concern in Kiribati. Initial attempts have been made to determine the amount, the constituents and contents of solid wastes that are fast accumulating on South Tarawa. It appears that much of what is being thrown away is organic and could therefore be used as compost, which in a country like Kiribati would seem to be the natural thing to do. Finding safe disposal areas for solid waste on land is a difficult task, and the current practice of dumping waste along the shoreline is having an adverse impact on the marine environment and public health. A project funded by the European Community to remove abandoned vehicles and machinery is planned for 1994 and will address that component of the waste stream.

Aim and scope

To determine the best ways of managing the disposal of solid waste, including the reduction of waste stream, particularly that of a non-biodegradable nature.

Description

The programme will provide technical assistance to design a plan for minimising waste and improving its disposal. Specifically, the plan should develop ways of:

(a) minimising the amount of waste, particularly non-biodegradable waste;
(b) promoting/maximising the recycling of waste such as bottles, tins, plastics etc.;
(c) improving the collection and disposal systems, as well as disposal sites for solid hazardous waste, again with special emphasis on recycling and reduction of the waste stream; and
(d) improving landfill designs and operations in South Tarawa.

An assessment will have to be made of the types and amount of waste generated, particularly in South Tarawa. Two months would be needed to complete the task. Efforts will be made to involve the communities in the discussion of the problems and solutions, through workshops and other forms of consultation.

Cost estimates

Technical assistance—2 months	20,000
Travel and DSA	10,000
Workshops (5 at $2,000 each)	10,000
Total costs	**$US 40,000**

Executing agency

The Environment Unit, Ministry of Environment and Natural Resources Development (MENRD) in close collaboration with the Public Works Division, Ministry of Works and Energy (MWE), the Tarawa Urban Council, Betio Town Council, the Ministry of Home Affairs and Rural Development (MHARD) and the Environmental Health Section, Ministry of Health, Family Planning and Social Welfare (MHFP&SW).

In-kind support	MWE, MENRD, MHARD and MHFP&SW will each provide a counterpart to assist in consultations and in the development of waste management plans. They will also provide logistical support.
Duration	2 months

Programme profile 4.2.1

National laboratory: feasibility study

Background

Another aspect of environmental protection is the careful control of residual chemicals in food and water. The tight control of importation of toxic chemicals, their storage, sale, use, and the disposal of containers is one facet. Another of equal importance is the regular monitoring for chemical residues of water and of food being sold in the markets and stores. This calls for an effort to strengthen national capacity to monitor and analyse the level of toxins in food and water.

The Ministry of Health, Family Planning and Social Welfare (MHFP&SW) operates a laboratory at the new Tungaru hospital to provide health support services. The laboratory could be redesigned to allow space for the preparation of samples and the analysis of foodstuffs (vegetables, cereals, fruits, meat, milk products) and water for residues of hazardous chemicals. A major constraint is the non-availability of trained, experienced, local laboratory technicians.

Aim and scope

To determine the feasibility of making Kiribati independent for the conduct of chemical analysis of water and of imported and locally produced foodstuffs, to protect the public against the misuse of pesticides and other toxic chemicals.

Description

The programme would be in four steps:

(a) a feasibility study on the viability of establishing a national laboratory through expansion of the existing MHFP&SW laboratory or establishment of another facility;
(b) provision of physical laboratory facilities, analytical equipment, glassware, chemicals, etc;
(c) recruitment of an analytical chemist for two years; and
(d) training of local staff.

The details for steps (b), (c) and (d) would be included in the feasibility study report, although much work has already been done on laboratory equipment and similar needs by the Agriculture Division of the Ministry of Environment and Natural Resources Development (MENRD).

Cost estimates

Technical assistance for feasibility study	
2 consultants, each for 1 month (chemist and economist)	20,000
Travel and DSA	10,000
Total costs	**$US 30,000**

Executing agency

The Ministry of Health, Family Planning and Social Welfare (MHFP&SW) in close consultation with the Ministry of Environment and Natural Resources Development (MENRD).

In-kind support

MHFP&SW and MENRD will provide counterparts to assist with the study as well as logistical support.

Duration

1 month

Programme profile 4.3.1

Implementation of the contingency plan to counter marine pollution

Background

The sinking in May 1993 of a United States purse seine tuna boat approximately 95 nautical miles to the west of Abaiang highlighted the ever increasing risk of a major oil spill occurring and the need, therefore, for marine and port staff to maintain some sort of readiness to deal with such emergencies. Marine resources represent the only real basis for sustainable development in Kiribati, so their protection from any and all kinds of pollution is vital. Kiribati has prepared a contingency plan to deal with marine pollution emergencies and requires the provision of equipment and the completion of training to ensure that the requirements of the contingency plan are implemented.

Aim and scope

To determine and acquire the type of equipment that would be required to combat the type of marine emergencies most likely experienced in Kiribati waters; to determine the most appropriate training courses to ensure that the operation of such equipment was being carried out according to specification; and to determine sources of funds for the purchase of equipment.

Description

The programme will fund a marine pollution expert for one month to prepare a list of necessary equipment and a source of equipment for purchase; to determine the most appropriate training programmes for the operators of such equipment; and to identify funding sources for such equipment and services.

Cost estimates

Technical assistance—1 month	10,000
Travel and DSA	5,000
Equipment	80,000
Training in-country	10,000
Total costs	**$US 105,000**

Executing agency

Ministry of Transport, Communication and Tourism (MTCT) in close consultation with the Environment Unit, the Ministry of Environment and Natural Resources Development (MENRD).

In-kind support

MTCT will provide a counterpart to assist the consultant as well as logistical and other office support.

Duration

Initial phase: 1 month

Programme profile 5.1.1

Population policy development

Background

The Kiribati government recognises the problems associated with rapid population growth and has formalised its intention of reducing the growth rate to 2.2 per cent by 1995, and to 2.0 per cent by 2000. The government's long-term aim is to create awareness of the benefits of small families and promote family planning methods so that the fertility rate will be reduced to a level where the population growth rate will ultimately reach zero. What is needed as a matter of priority is to develop and implement a national population policy to guide programmes and project activities aimed at achieving the stated targets for population growth. This is being done through the Ministry of Health, Family Planning and Social Welfare (MHFP&SW).

One of the most important functions of a national population policy is to ensure the integration of population issues into environmental planning and management. A national population policy should also include realistic goals (population growth rates etc.), a time frame, and resource provisions for achieving the goals.

Aim and scope

To develop, refine and implement the population policy for Kiribati.

Description

The programme will fund the development of a population policy, which will be carried out in two stages:

(a) the conduct of workshops on population issues and their implications for sustainable development and, within the context of workshops, to clarify issues to be addressed in a population policy; and

(b) production of a draft population policy for discussion with government and communities.

This will require the service of a population policy expert for six months.

Cost estimates

Technical assistance—6 months	30,000
Travel and DSA	20,000
Internal travel	10,000
Workshops (10 at $2,000 each)	20,000
Printing and materials production	10,000
Total costs	**$US 90,000**

Executing agency

The Family Planning Unit of the Ministry of Health, Family Planning and Social Welfare (MHFP&SW) in collaboration with the Environment Unit, Ministry of Environment and Natural Resources Development (MENRD).

In-kind support

MHFP&SW will provide a counterpart and some resource persons and materials and logistical support while MENRD will provide some resource persons and materials.

Duration

6 months

Programme profile 5.2.1

Planned urbanisation and balanced development

Background

One of the most significant demographic features of Kiribati is the uneven distribution of the population. Over 90 per cent of the total population (72,298) live in the Gilbert Group, with one third of the total population squeezed on the tiny islets of urbanised South Tarawa. The population density overall is 85 per sq km.

In South Tarawa, however, the density is 1,515 per sq km, and on Betio, the ratio is a staggering 4,500 per sq km. By the end of the century, the density of population on Betio is expected to rival that of Hong Kong. Rapid urbanisation, with people moving from the outer islands to South Tarawa, has been the single most important contributing factor (Thaman et al. 1992).

The result of overpopulation in the urban areas has been to exceed the natural carrying capacity of South Tarawa islets. A host of other (social) problems have emerged with the rapid increase in the number of people residing in South Tarawa: groundwater depletion and pollution; overfishing; garbage/sewage disposal problems; coastal erosion; shortage of firewood; and generally poorer health and sanitation with a relatively high infant mortality rate and low life expectancy, and increasing incidence of nutrition-related, non-communicable diseases.

It is widely understood, however, that many of these problems could be overcome with proper urban planning/implementation, and a stronger commitment to diverting some of the development initiatives to the outer islands so as not to focus all development on South Tarawa.

Aim and scope

(a) To establish minimum standards or benchmarks for development of land, housing, water, and sewage/waste disposal in South Tarawa, and to strengthen the capacity of those agencies charged with urban management through clearer policy directives and greater resources.
(b) To understand the dynamic nature of the forces controlling the development of South Tarawa and the outer islands of the Gilbert Group.
(c) To assess to what extent the dynamics outlined above can be modified or enhanced to achieve the objectives of balanced development.

Description

The programme would fund the development of an economic planning strategy for the Gilbert Group including an urban master plan for South Tarawa, and also provide resources for personnel, equipment, and training for those agencies charged with urban management. The priority is to develop, through a wide process of consultation, some clear economic planning and development directions, and minimum standards or benchmarks for the further development of land, housing, water, and sewage/waste disposal in South Tarawa and other islands of the Gilbert Group.

The master plan should also propose appropriate administrative structures and policies for effective implementation to avoid overlapping responsibilities and mandates. The plan would specify resources needed by those agencies which will be dealing with urban management, in the form

of a capacity-building project proposal. A draft of the plan would be submitted for further public consultation before finalising it for Cabinet consideration.

Cost estimates

Technical assistance—6 months	100,000
Travel and DSA	20,000
Workshops (5 at $2,000 each)	10,000
Printing	10,000
Total costs	**$US 140,000**

Executing agency

The Lands and Survey Division of the Ministry of Home Affairs and Rural Development (MHARD), in close consultation with the Ministry of Finance and Economic Planning (MFEP), local government, the Ministry of Health, Family Planning and Social Welfare (MHFP&SW) and the Environment Unit, Ministry of Environment and Natural Resources Development (MENRD).

In-kind support

MHARD and perhaps MFEP will each provide a counterpart to assist in the preparation of the plan and the consultation, as well as logistical support.

Duration

6 months

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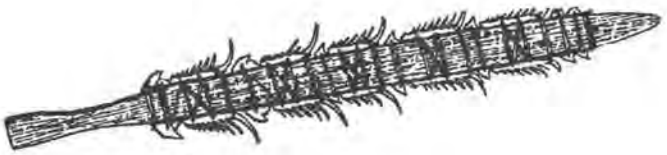

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Cost estimates

Preparatory phase (project formulation)	50,000
Consultants	
(hydrologist 3 months; water engineer 2 years)	200,000
Civil works	1,500,000
Contingency 10%	150,000
Household constructions	
(loan funds for on-lending to householders for construction of new catchment systems or repair and expansion of existing ones)	1,000,000
Public awareness campaigns	200,000
Training	150,000
Total costs	**$US 3,250,000**

Different donors could fund separate components of the programme. A loan from the Asian Development Bank could be negotiated but to avoid unrealistic repayment obligations, it may be better to restrict the loan to funds which are to be lent to the public (that is, $US 1,000,000 for household rainwater system construction). The possibility of a capital grant ($US 1,500,000 for civil works) from the United Nations Capital Development Fund (UNCDF) could be investigated, and other multilateral (UNDP) and bilateral (Australia and New Zealand) donors could be approached for technical assistance grants for project formulation, consultants, public awareness campaigns and training.

Executing agency

Public Works Division, Ministry of Works and Energy (MWE). The Development Bank of Kiribati would implement the lending scheme for household rainwater catchment construction, and the Public Works Division in close consultation with the Ministry of Environment and Natural Resources Development (MENRD) and the Ministry of Education, Science and Technology (MEST) would implement the public awareness and training components.

In-kind support

MWE would provide national counterparts and logistical/office support. MENRD and MEST would also provide personnel and logistical support for public awareness campaigns and training.

Duration

3 years

Programme profile 3.6.2

Protection of special habitats and species

Background

Although Kiribati is limited in terms of terrestrial biodiversity, some uninhabited atolls and islets are globally important sea bird rookeries with important roles in the oceanic ecosystems. They also contain significant populations of rare birds.

However, in general the resource base in Kiribati is so limited that populations will not be sustained for much longer unless conservation or protective regimes are effective. As it is, much of Kiribati's terrestrial and marine flora and fauna have been severely affected by generations of human habitation and use, and by unsustainable resource-use practices characteristic of the modern development ethos. With regards to indigenous plants, many of which have high cultural and utilitarian values (providing food, timber, fuel, medicine, shelter), they are not being planted or protected by today's generation, with the result that some of them are endangered, if not extinct.

Preliminary analyses of available data indicate that the 29 indigenous plant species in Kiribati have at least 170 uses, although many of these have lapsed with the advent of modern technology and medicine. Similarly, an increasing number of marine species of economic, nutritional and cultural importance are declining in number and size, with some evidence of local extinction of some species of giant clams, coconut crabs, sea turtles and sea birds.

The loss of these species has a direct bearing on the livelihood of the I-Kiribati, and on the overall balance of the ecosystems in which they were found. An example of a special habitat which needs protection because of its critical role in protecting the foreshore and in spawning marine life is the mangrove (see Programme profile 3.6.3).

Aim and scope

To identify those special habitats and species which need protection and establish protective or conservation regimes.

Description

The programme will initially focus on identifying the critical habitats and species for protection. The protection of biodiversity is an important consideration, as is the cultural and utilitarian value of such habitats and species. The programme will involve consultation over three months to identify such habitats and species and discuss ways of protecting them.

Cost estimates

Technical assistance—3 months	30,000
Travel and DSA	10,000
Internal travel and accommodation for local members	10,000
Workshops	10,000
Total costs	**$US 60,000**

Executing agency

Environment Unit in close consultation with the Agriculture and Fisheries Divisions of the Ministry of Environment and Natural Resources Development (MENRD).

In-kind support	MENRD will provide a national counterpart to assist in the survey and consultations, as well as logistical support for the survey and workshops.
Duration	3 months

Programme profile 3.6.3

Conservation and management of mangroves

Background

Mangroves are now recognised as critical habitats which need conservation. They play a vital role in the sustainable development of Kiribati; they offer protection against coastal erosion and salt sprays (agriculture), while providing spawning grounds for the many types of marine life on which I-Kiribati are dependent for their livelihood. Mangroves also provide building materials and firewood. In Kiribati, mangroves are being used (for building materials and firewood) and destroyed (to make way for causeways and milkfish ponds) at an alarming rate. Given their critical role in the Kiribati ecosystems — indeed, in the livelihood of I-Kiribati — they need to be managed in a sustainable manner.

Aim and scope

To determine the best way of managing and developing/using the mangroves of Kiribati in a sustainable manner, and to investigate the designation of mangrove reserve areas to ensure ongoing protection.

Description

The programme would provide the Atoll Research Programme (ARP) of the University of the South Pacific with a research assistant, equipment and other resources to enable it to:

(a) survey and determine the status of the mangroves and the pressure they are under;
(b) conduct an awareness campaign on the importance of mangroves;
(c) consult with communities and the government and develop an action plan to conserve and sustainably manage the mangroves.

Cost estimates

Research assistant—2 years	15,000
Equipment	8,000
Internal travel and accommodation	5,000
Workshops (5 at $2,000 each)	10,000
Report printing	1,500
Total costs	**$US 39,500**

Executing agency

The Atoll Research Programme (ARP), University of the South Pacific in close collaboration with the Ministry of Environment and Natural Resources Development (MENRD).

In-kind support

The Atoll Research Programme will provide a programme coordinator and logistical and other office support.

Duration

2 years

Programme profile 3.6.4

Review and improve conservation arrangements for the Phoenix Group and Line Islands

Background

Reserves and wildlife sanctuaries have been established in the Phoenix Group and the Line Islands. The islets of these groups are globally important sea bird rookeries with important roles in the oceanic ecosystems. They also contain significant populations of rare birds.

But these two groups, particularly the northern islands of the Line Islands, are also the target of a resettlement programme to alleviate population pressures in South Tarawa and balance out the distribution of population. Already on Kiritimati in the Line Islands, the human population is having an impact on the natural habitats of birds and marine life.

There is a need, therefore, to review the present situation and plans to determine how best to balance the requirements of a protected area against the needs of human populations. Similarly, the need for marine reserves should be reviewed.

Aim and scope

To review the present status of the reserves and wildlife sanctuaries in the Phoenix Group and Line Islands and recommend the best ways of ensuring the protection of critical habitats and species while allowing for the requirements of human populations.

Description

Technical assistance for the review could be recruited under the South Pacific Biodiversity Conservation Programme (SPBCP) administered by the South Pacific Regional Environment Programme (SPREP). The review, including consultations, should take two months. The recommendations of the review team would be submitted to the Kiribati Task Force on the Environment before being taken to Cabinet for approval.

Cost estimates

Technical assistance (2 for 2 months each)	40,000
Travel and DSA	20,000
Internal travel and accommodation for local members	10,000
Equipment for ecological surveys	10,000
Printing	5,000
Total costs	**$US 85,000**

Executing agency

The Environment Unit and the Wildlife Conservation Unit in close collaboration with the Agriculture and Fisheries Divisions, Ministry of Environment and Natural Resources Development (MENRD) and the Ministry of Home Affairs and Rural Development (MHARD).

In-kind support

MENRD will provide national counterparts and logistical support.

Duration

2 months

Programme profile 3.6.5

Establishment of an arboretum of traditional cultural and medicinal plants of Kiribati

Background

Many of the traditional cultural and medicinal plants of Kiribati are in danger of extinction due to habitat modification and loss of utility. Such plants are not only important for the preservation of I-Kiribati culture; there is now increasing recognition of their medicinal, social and ecological value.

Preliminary analyses of available data indicate that the 29 indigenous plant species in Kiribati have at least 170 uses, although many of these have lapsed with the advent of modern technology and medicine. Unlike previous generations, new generations are not making an effort either to protect or replant surviving species. Under other strategies being suggested here, efforts will be made to encourage the use and protection of such plants. But, as in any other forestry or fruit tree project, there is also a need to support such efforts through an arboretum.

Aim and scope

To review the feasibility of, and write a proposal for, establishing an arboretum of traditional cultural and medicinal plants of Kiribati.

Description

The programme would fund the recruitment of a botanist with special interest in cultural and medicinal plants to review the flora of Kiribati and the feasibility of establishing an arboretum. The botanist will be assisted by an I-Kiribati expert in traditional uses of plants.

Cost estimates

Technical assistance—3 months	30,000
Travel and DSA	10,000
Recruitment of I-Kiribati expert	2,000
Internal travel and accommodation	10,000
Total costs	**$US 52,000**

Executing agency

The Agriculture Division and the Environment Unit, Ministry of Environment and Natural Resources Development (MENRD) in close collaboration with the Cultural Division of the Ministry of Education, Science and Technology (MEST).

In-kind support

MEST and MENRD will provide a national counterpart and logistics support and other office support.

Duration

3 months

Programme profile 3.6.6

Training workshops on the conservation and management of reefs and marine living resources in Kiribati

Background

Marine resources hold the best hope of sustainable development for Kiribati. They are vast and therefore difficult to manage, but also rich and diverse and have been critical to the survival of I-Kiribati on their atoll environments. Evidence suggests that much of Kiribati's pelagic resources are under-utilised and the Kiribati government is keen to ensure maximum benefits from these resources.

At the same time, there is some disturbing evidence of damage to the inshore habitats of the living resources (reefs, lagoons, mangroves etc.) due to overuse and abuse (waste pollution, bacterial contamination etc.). There is also evidence of overfishing on some stocks, particularly in the lagoons of overcrowded South Tarawa. The number and size of some species are declining, with some evidence of local extinction of some species of giant clams, coconut crabs, sea turtles and sea birds. Efforts are currently being made to determine the exact status of some of the inshore resources (for example, the Tarawa Lagoon Management Plan funded by USAID). The results of such efforts should be incorporated in strategies to manage marine resources sustainably.

For the immediate future, however, there is a need to embark on a public education programme focusing on the importance of marine life, the implications of human actions, and the sorts of attitudes and behaviour that would ensure less misuse or abuse of such a resource base.

Aim and scope

To raise public awareness regarding the importance of reefs and marine living resources, and the need for conservation and effective management.

Description

The programme will provide resources with which to run training workshops for community leaders from throughout Kiribati. The workshops will include coverage of the nature of coral reefs and marine living resources in Kiribati; their role in the ecosystems and I-Kiribati livelihood; the pressures they are under, particularly those due to human/government actions; the damage being done and implications for I-Kiribati; the need to change attitudes and behaviour; and other strategies for proper management of such a resource base. The resource materials, including personnel, will be provided by the Ministry of Environment and Natural Resources Development (MENRD) in consultation with the Atoll Research Programme.

Cost estimates

Travel and accommodation for participants	10,800
Transport	1,000
Equipment	1,500
Hospitality	1,000
Resource materials	2,700
Total costs	**$US 17,000**

Executing agency	The Ministry of Environment and Natural Resources Development (MENRD) and the Ministry of Home Affairs and Rural Development (MHARD) in close collaboration with the Atoll Research Programme (ARP), University of the South Pacific.
In-kind support	The Atoll Research Programme will provide a programme coordinator, use of facilities, and secretarial support. MENRD will provide some resource people and logistics support.
Duration	1 week

Programme profile 4.1.1

Pilot study in alternative sanitation technology

Background

A major concern in Kiribati is sewage disposal. Given the problems of maintaining a central sewerage system in widely dispersed communities like those in Kiribati, there is a need to investigate alternative, discrete, and more environmentally-friendly sewerage systems. There is also the problem of poor soils, which could benefit from the use of processed waste, if this practice could be accepted culturally. Some of the bio-toilet/biofilter sewage treatment systems have been successfully introduced in other countries, and could be trialled in Kiribati for possible use in areas (rural South Tarawa and all outer islands) outside the South Tarawa salt-water sewerage system.

Aim and scope

To improve sewage disposal systems in an environmentally safe way, and thereby improve human health.

Description

The proposed programme would fund the preparation of a detailed pilot study of three types of bio-toilet systems:

(a) closed bio-toilets with fertiliser production for individual households;
(b) sealed tank toilets with pumper truck collection, biogas production and fertiliser production; and
(c) the 'Enviroflow' biofilter system which can provide waste and waste water treatment for communities ranging from 10 to 5,000 people.

Systems would be procured and installed on South Tarawa and their performance evaluated over a two-year period. Training in system maintenance would be provided, and a public campaign on the health and other community benefits of the systems promoted.

Cost estimates

Preparatory phase (project formulation)	20,000
Total costs	**$US 20,000**

The project proposal will provide detailed cost estimates for system procurement, installation, operation and maintenance.

Executing agency

The Ministry of Health, Family Planning and Social Welfare (MHFP&SW) in cooperation with the Environment Unit and Agriculture Division, Ministry of Environment and Natural Resources Development (MENRD) and the Ministry of Works and Energy (MWE).

In-kind support

MHFP&SW will provide a national counterpart and logistical support.

Duration

2 months