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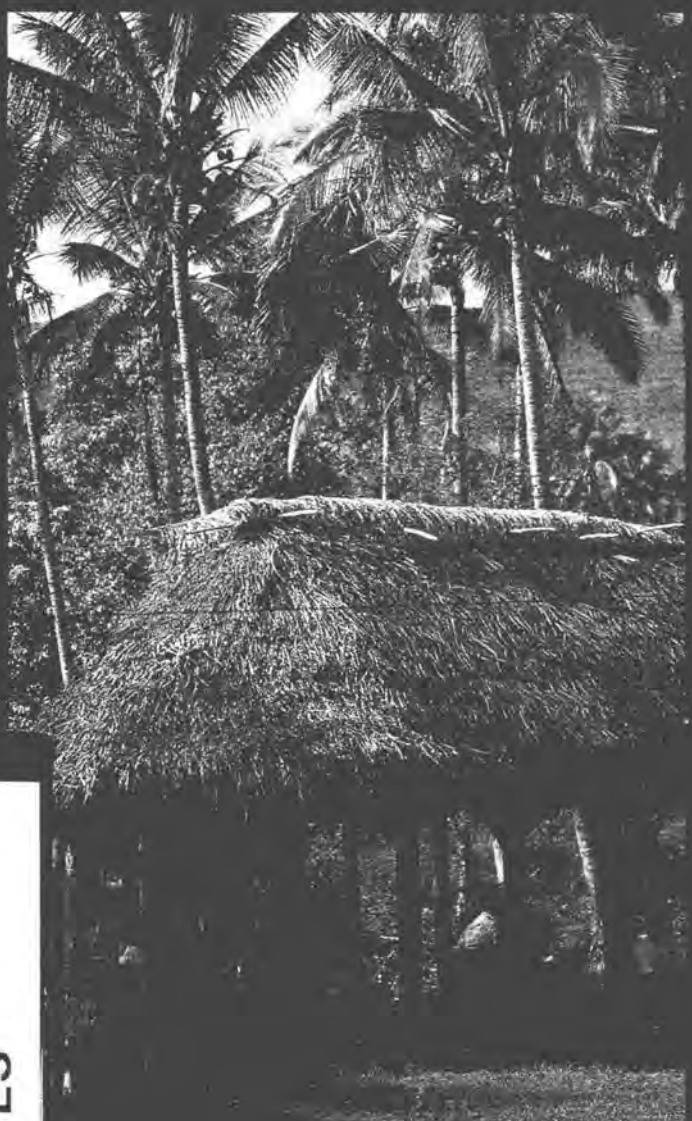

Western Samoa

National
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Management
Strategies

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Western Samoa

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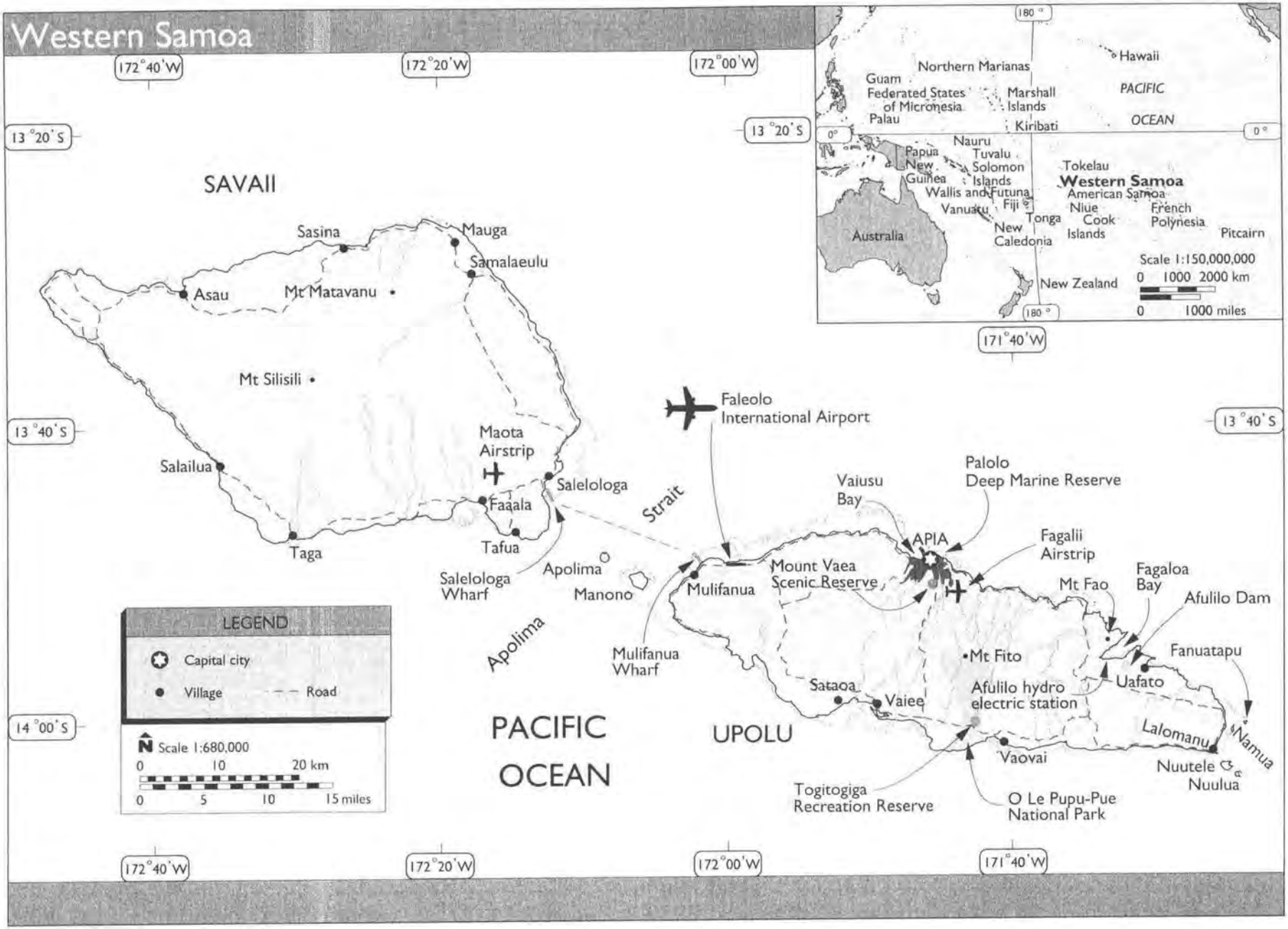
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Salelologa Wharf
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Manono
Strait
Faleolo International Airport
Mulifanua
Mulifanua Wharf
Apolima
PACIFIC OCEAN
UPOLU
Vaiusu Bay
Palolo Deep Marine Reserve
APIA
Fagalii Airstrip
Mount Vaea Scenic Reserve
Mt Fao
Fagaloa Bay
Afulilo Dam
Mt Fito
Fanuatapu
Uafato
Afulilo hydro electric station
Sataoa
Vaiee
Lalomanu
Vaovai
Nuutele & Nuulua
Namua
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O Le Pupu-Pue National Park
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Village
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Guam
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Papua New Guinea
Solomon Islands
Tokelau
Western Samoa
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Foreword

Western Samoa faces a challenging decade. It has become increasingly apparent that our natural resources are deteriorating due to the pressures we are placing upon them. As the resources deteriorate, other problems arise. For example, our forests are being cleared at a rapid rate for agricultural use and for their timber; among the consequences are loss of water quality and supply, and loss of biodiversity.

We also know that there is no miracle solution. Like many Pacific Island nations, we have no mineral or oil deposits that will provide the ready cash to repair environmental damage, or provide for increasing aspirations. The natural resources that are under threat are the same resources that we will need to provide for our future health, welfare and economic development.

The move towards sustainable development will require a commitment from all of us: as individuals, as members of communities, and as members of government and non-governmental agencies. It will require a fundamental change in our attitude to our environment — a realisation that there are limits to the seemingly abundant resources of our islands.

There are many things that need to be done. The Government of Western Samoa recognises that it has the responsibility to lead the way by reviewing its policies and legislation, and ensuring that its environmental efforts are soundly based and well coordinated. For this reason the Government supported the establishment of a National Environmental Management Strategies Task Team, and Cabinet was pleased to approve the National Environment and Development Management Strategies (NEMS), as set out in Part 2 of this publication, in February 1993.

Environmental problems often have complex causes and require interdisciplinary solutions. For this reason Cabinet recommended that the membership of the NEMS Task Team include key government and non-governmental agencies. The Chairmanship and executive tasks were the responsibility of the newly formed Division of Environment and Conservation, Department of Lands, Surveys and Environment. The document produced as the result of the Task Team's deliberations was reviewed by a public meeting.

This document is just a beginning, a framework for the preparation of detailed policies and educational efforts that will guide the government and the Samoan people towards a more sustainable future.

The National Environment and Development Management Strategies could not have been completed without the financial assistance extended by the United Nations Development Programme and the collaborative assistance of the South Pacific Regional Environmental Programme (SPREP). The Government gratefully acknowledges the assistance of those organisations.

In embracing the concept of sustainable development, the Government is only too aware of the difficulties inherent in its implementation. It would therefore welcome the continuing support of its development partners in the international community as it pursues sustainable development through the implementation of the National Environment and Development Management Strategies.

Honourable Tofilau Eti Alesana
Prime Minister of Western Samoa

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Notes The units of currency of Western Samoa are the 'tala' (dollar) and the 'sene' (cent). All currency amounts in Parts 1 and 2 are in Western Samoan 'tala' unless otherwise specified. Currency amounts in Part 3 (Programme profiles) are in United States dollars ($US).

A financial year spans the period 1 July to 30 June.

Acknowledgements

No document of this size and complexity can be completed without the assistance of many individuals.

In particular I wish to thank the Prime Minister of Western Samoa, the Honourable Tofilau Eti Alesana who strengthened the NEMS process and the NEMS Task Team through the high visibility he accorded NEMS at the Earth Summit, as well as providing his unswerving support to environmental concerns.

Without the financial assistance of the United Nations Development Programme (UNDP) through the South Pacific Regional Environment Programme (SPREP), this Project would not have been possible. The continued support of SPREP's Director, Dr Vili Fuavao, and in particular, SPREP's NEMS Team Leader, Neva Wendt, is therefore gratefully acknowledged.

Throughout the NEMS Project, Samuelu Sesega, Principal Environmental Officer of the Division of Environment and Conservation, was Executive Officer to the Task Team. His guidance and leadership is particularly acknowledged.

Over the two-year period from inception to completion of this document, many individuals served as members of the NEMS Task Team. Core members were:

- Tanielu Aiafi (Education Department)
- Malu Faalogo (Ministry of Transport)
- Malaki Iakopo (Department of Agriculture, Forests and Fisheries)
- Vaasili Moelagi Jackson (Faasao Savaii Society)
- Dr Le Mamea Matatumua (Health Department)
- Mary Petaia (Ministry of Women Affairs)
- Clark Peteru (O le Siosiomaga Society)
- Sharon Potoi (Ministry of Foreign Affairs)
- Fualau Misiolo Sofe (Department of Trade, Industry and Commerce)
- Florence Saaga (Western Samoa Visitors Bureau)
- Dr Namulauula Kamuta Seuseu (Health Department)
- Dr Lemalu Toso (Family Health Association)
- Lonise Tanielu (Education Department)
- Arasi Tiotio (Treasury Department)
- Neva Wendt (SPREP)
- Roger Cornforth (Department of Lands, Surveys and Environment)
- Sailimalo Pati Liu (Department of Lands, Surveys and Environment).

I also note with gratitude the support of all departments whose representatives were members of the NEMS Task Team, and of the heads of these departments who made available time and other resources of their respective departments for NEMS meetings as well as for the compilation of departmental and sector reports. I would also like to record my thanks to the UNESCO office in Apia for providing their meeting facilities free of charge to the Task Team.

Tuuu Ieti Taulealo replaced Muliagatele Iosefatu Reti as the NEMS Consultant. He undertook the major task of developing the framework for NEMS and preparing this document with the valuable input of the Task Team. The document is testimony to his energy and skills, and to the commitment by him and the Task Team to the need for change to a more sustainable form of development. Tuuu Ieti Taulealo was ably assisted initially by Jennie Cary, and later by her replacement, Julia Haska.

In November 1992 a public meeting was held to discuss the first draft of this document. Over forty people from government and non-governmental

agencies attended and contributed to the discussions. Particular thanks go to the people of the discussion panel:

- Peter Groves (Western Samoa Water Authority)
- Francois Martel (Department of Agriculture, Forests and Fisheries)
- Muliagatele Iosefatu Reti
- Henrietta Winterstein (Department of Agriculture, Forests and Fisheries)
- Dr Semisi Toa (Department of Agriculture, Forests and Fisheries).

I would also like to thank the current and former directors of the Department of Lands, Surveys and Environment, respectively Faamausili Tuimalealiifano and Fiu Mataese Elisara-Laulu, for their support for this Project.

Finally, many past and present staff of the Division of Environment and Conservation assisted with the organisational and administrative needs of the Project: Steve Brown, Tepa Suaesi, Bronwyn Leupolu, Easter Chu Shing, Netty Keresoma and Niu Malaki.

Faasootauloa Pati
Minister of Lands, Surveys and Environment

❖ ❖ ❖

The preparation of the National Environment and Development Management Strategies (NEMS) for Western Samoa is part of an ongoing process of community awareness raising, policy making and planning for environmental protection which is a necessary component of the country's future economic development activities. The process of developing NEMS has been an important one involving review of existing administrative, institutional and legislative mechanisms together with determination of detailed programmes for implementation of the tasks identified under each of the Strategies. Valuable financial assistance which has enabled this process to continue smoothly has been provided by the United Nations Development Programme (UNDP). For their technical expertise in preparation of this important information we would like to thank Mr Clark Peteru, Mr Kosimiki Latu, Ms Elizabeth Harding, Mr Iosefa Maiava, Mr Tuuu Ieti Taulealo, the staff of the Division of Environment and Conservation, Department of Lands, Surveys and Environment, especially Mr Samuelu Sesega, the Executive Officer to the Task Team and, for her valuable and continuing input, Ms Julia Haska.

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 institutional-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 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-governmental organisations, and communities in a spirit of inclusiveness and social integration.

UNDP therefore applauds the timely publication of the National Environment and Development Management Strategies for Western Samoa. 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 Western Samoa National Environment and Development Management Strategies (NEMS) is a practical document which aims to identify the major environmental issues in Western Samoa and the priority environmental programmes which are required to address them. The emphasis has been on ownership of NEMS by the government and the people of Western Samoa. The process which has resulted in the preparation of NEMS has involved many participants and has been directed by a National Task Team, comprising relevant government and non-governmental organisations in Western Samoa.

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 Western Samoa and with other regional and international organisations in the implementation of NEMS.

Vili A. Fuavao
Director
South Pacific Regional Environment Programme

Acronyms

AIDAB	Australian International Development Assistance Bureau
AMA	Apia Municipal Authority
CBS	Central Bank of Samoa
DAFF	Department of Agriculture, Forests and Fisheries
DEC	Division of Environment and Conservation
DLSE	Department of Lands, Surveys and Environment
DOS	Department of Statistics
DP7	Western Samoa's Seventh Development Plan 1992–1994
DTCI	Department of Trade, Commerce and Industry
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPC	Electric Power Corporation
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GWS	Government of Western Samoa
MFAT	Ministry of Foreign Affairs and Trade (New Zealand), Wellington, New Zealand
NEMS	National Environment and Development Management Strategies
NUS	National University of Samoa
NGO	non-governmental organisation
PSC	Public Service Commission
PWD	Public Works Department
SPAFH	South Pacific Alliance of Family Health, Port Moresby, Papua New Guinea
SPREP	South Pacific Regional Environment Programme, Apia, Western Samoa
SOE	State of the Environment Report
SOPAC	South Pacific Applied Geoscience Commission, Suva, Fiji
TEC	Target Environmental Component
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
USP	University of the South Pacific
WSVB	Western Samoa Visitors Bureau
WSWA	Western Samoa Water Authority

Executive summary

The need for NEMS in Western Samoa

There is a growing concern in Western Samoa over environmental issues, and a growing understanding of the need for economic development to be properly planned in order to take environmental constraints into account. Such an integration of environment and development is generally referred to as sustainable development. It is a new thrust in the pursuit of an acceptable and dignified level of social well-being, and the primary focus of global development efforts today.

The concern about protecting the environment and conserving the use of natural resources is evident at all levels of Samoan society: individual; village; non-governmental and government organisation alike. Government commitment in this area is shown most notably in the establishment of the Division of Environment and Conservation (DEC).

Environmental degradation has complex causes and long-term adverse effects and consequences. One major example is the increasing demand on limited natural resources by a rapidly growing population. As elsewhere in the world, the inevitable result is resource depletion. There are also the projected effects of climate change and sea-level rise which, as in other Pacific islands, is likely to have serious adverse implications for Samoa's physical and economic environments.

NEMS is Western Samoa's attempt to provide a planned and systematic approach to the integration of development and environmental concerns. The implementation of NEMS will promote the use of a consistent and sound set of principles and guidelines that will guide and assist the development process along a sustainable pathway.

The main principles upon which NEMS is based are adapted from those declared at the United Nations Conference on Environment and Development (UNCED) at Rio de Janeiro, 3–14 June 1992 (known as the Rio Declaration). These principles place the well-being of people first and foremost. At the same time, the principles also recognise that people and the environment are interrelated and inseparable: a clean and balanced physical environment is essential if societies are to achieve a condition of well-being that is acceptable and dignified for all citizens. As Western Samoa has already signed the Rio Declaration, the principles of NEMS already have the endorsement of its government.

Framework for NEMS

This document focuses on the critical environmental issues, or Target Environmental Components (TECs), facing Western Samoa rather than focusing on the issues facing different government sectors. The approach aims to reduce sectoral interests and increase cooperation between agencies. In this way it recognises the complex and interactive nature of environmental issues and problems.

The twelve TECs identified for priority consideration are the following.

(1) Management of population dynamics and trends
(2) Protection of the quality and supply of fresh water
(3) Protection of the sea and marine resources
(4) Management of waste
(5) Combating deforestation
(6) Development of appropriate land use practices
(7) Conservation of biological diversity
(8) Protection of the atmosphere

(9) Planning for climate change
(10) Preservation of traditional arts, culture and history
(11) Development of human resources
(12) Promoting sustainable economic growth

NEMS long-term goals are the improvement of the welfare of all Samoan citizens and the realisation of community expectations through sustainable development by means of:

- stabilising population;
- boosting efficiency;
- restraining consumption; and
- building a framework for change.

Much is expected from all citizens if these goals are to be realised. It is important that the necessary political commitment is provided through policies which create a proper climate for sustainable development.

This document recommends that the development of NEMS be carried out in three phases:

- Phase 1 establishes the framework and recommends guidelines for national policies. (This is the current document.)
- Phase 2 deals with the preparation and formulation of national policies.
- Phase 3 involves the implementation of the policies through their approved Action Plans.

The process of change

The most difficult task related to the achievement of NEMS goals is undoubtedly the mobilising of a process of change. Many of those changes will ultimately require commitment at the individual level, so the process will need full community support and participation if it is to succeed. It requires:

(1) the public to be aware of environmental issues;
(2) political leaders to provide sound policy guidelines for environment and development activities; and
(3) the community to promote the necessary actions to achieve sustainable development.

These are the three As of Change:

Awareness + **A**genda + **A**ction → **C**hange

Chapter 4 of this document discusses in detail some of the ways in which these key issues might be addressed.

Current status of the local environment

A summary of the state of the environment found in Chapter 5 shows an increased demand for resources, resulting in their rapid depletion and/or degradation. The population is now four times that at the turn of the century.

The impact of population growth on resources is most clearly manifested in the problem of deforestation. The Task Team identified this problem as the major concern which in turn causes other environmental problems such as fresh water depletion and pollution, marine environment degradation, loss of biodiversity and soil erosion.

Other environmental issues also need attention. There is a need to be better prepared for the adverse consequences of projected climate change and sea-level rise. Traditional arts and crafts need to be preserved through the development of appropriate cultural facilities. While attempts have been made to promote the sustainable development of human resources and economic growth, further effort is still required to ensure that these are well integrated into national environment and development planning.

A supplementary document, *Western Samoa: State of the Environment Report,* has also been prepared (Taulealo 1993).

National environmental policies

Without clear policies for the identified Target Environmental Components (TECs), it is premature to recommend specific activities to address the TECs. National policies represent the Government's position, and are its statements or plans to show the direction and scope of actions for the TECs. Government endorsement for the framework for NEMS is therefore a prerequisite for the policy development of Phase 2.

NEMS implementation

Work on NEMS Phase 1 started in November 1991 with the first meeting of the Task Team. However, due to the effects of Cyclone Val in December the same year, work was delayed until July 1992. The proposed time frame for NEMS implementation is as follows.

- Phase 1 (Framework) (This document marks the end of Phase 1.)
- Phase 2 (Policy)
- Phase 3 (Activities)

It is proposed that a committee undertake the preparation of draft policies for each TEC. This document recommends that the TEC Policy Committees comprise the organisations and individuals which deal with or have interests in the respective TECs. The agencies most involved with or having authority for a TEC will become the Implementation Agencies and must assume the lead role in policy formulation. Chapter 7 provides further details of their structure.

When policies are approved, TEC Advisory Committees are formed to prepare Action Plans and to oversee policy implementation. One of the most important aspects of the implementation process is regular evaluation to assess the extent to which the goals have been met, and to recommend necessary changes.

Finally, it is recommended that a NEMS Advisory Committee which will be set up within the Division of Environment and Conservation be responsible for the coordination of policy implementation. However, in the long term, a separate organisation is recommended for environment and planning. Such an organisation will be responsible for the coordination of all national environment and development planning, and for the management of other environmental services.

Specific programme profiles

As stated above, the primary function of this NEMS document is to establish a framework for the NEMS process in Western Samoa (Phase 1). Phase 2 will see the preparation of national policies which will include the formulation of specific objectives, activities and programmes.

It is important, however, that this document provides an indication of which programmes are seen by the Government of Western Samoa as having highest priority for funding at this stage of the NEMS process. These are the programme profiles in Part 3 of this document.

PART I
The Western Samoan setting

Chapter 1

The setting

A National Environmental Management Strategy (NEMS) must be formulated in the context of the overall natural, socio-economic, cultural and political environment. In Western Samoa the opportunity to prepare such a strategy coincided with an increase in concern for environmental issues. Western Samoa's natural resources have already been degraded and the pressure on them continues to mount.

Compared with many Pacific Island nations, Western Samoa has a range of environmental legislation and an extensive government infrastructure. In 1992 the Government incorporated environmental concerns into its long-term development planning tool, the Seventh National Development Plan, or DP7 (GWS 1992). The National Environmental Management Strategy, renamed the National Environment and Development Management Strategies (NEMS) in Western Samoa, is a further stage in integrating development and environmental issues.

This chapter provides a brief overview of Western Samoa in terms of its location and size, climate, land, sea and people. It is not the intention to reproduce here the information contained in *Western Samoa: State of the Environment Report* (SOE) (Taulealo 1993), but merely to provide a background. The reader is referred to the Report itself for further details.

No survey of the status of the environment would be complete without mention of the impact of two recent cyclones. While tropical cyclones are a natural event, Western Samoa experienced two of the worst cyclones in recorded history in 1990 and in 1991. Cyclone Ofa caused an estimated $300m in damages, and the five-day fury of Cyclone Val further devastated homes, infrastructure, agricultural and forestry enterprises, and natural areas. The cost of Cyclone Val to the economy has been calculated as at least $600m but the full impact of the cyclones on the natural environment will never be known. A general survey after Cyclone Val reported severe devastation of critical lowland sites, tree crops and forests, with profound impact on natural ecosystems and biological diversity (Park et al. 1992).

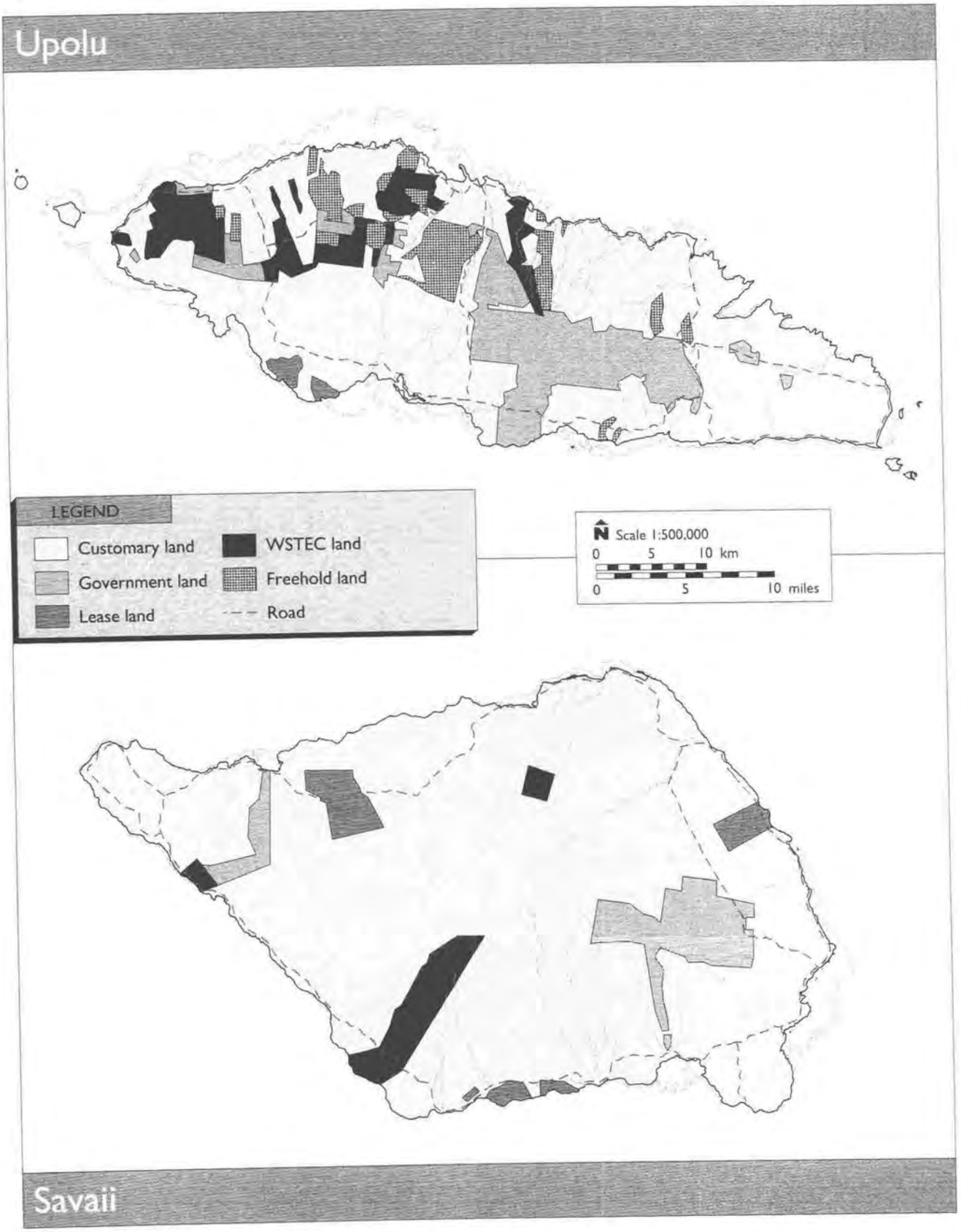
1.1 Location and size

Western Samoa lies in the south-west Pacific between latitudes 13° 25'S and 14° 05'S, and longitudes 171° 23'W and 172° 48'W. It comprises two main islands, seven smaller islands (two of which are inhabited), and islets and rocks. Upolu extends about 72 km from east to west and up to 24 km from north to south. Savaii is also about 72 km across, but about 35 km wide. The total land area is approximately 2,820 sq km, with the two main islands of Upolu and Savaii comprising 1,115 and 1,700 sq km respectively. The capital, Apia, is on Upolu and lies about 130 km from Pago, American Samoa, 3,000 km from Auckland, New Zealand and 4,500 km from Sydney, Australia.

Western Samoa is an oceanic volcanic archipelago formed in a westerly direction. The islands are still volcanically active, the last eruptions being on Savaii in 1760, 1902 and 1905–11, and earth tremors are frequent. The islands are still undergoing isostatic sinking to compensate for the large volume of volcanic material ejected onto the crust.

With the exception of areas of recent lava flows, both islands are mostly surrounded by shallow lagoons and a fringing reef. Both islands have coastal plains four to five km wide, then rise to central mountains. Savaii has a central core of volcanic peaks surrounded by a ring of lava-based plateaux, then lower hills and coastal plains. Upolu has a

Figure 1.1 Land ownership



Source: After GWS 1993

chain of volcanic peaks running from one end of the island to the other, with hills and coastal plains on either side. Savaii's mountains rise to over 1,500 m (Mount Silisili, the highest is 1,858 m), Upolu's mountains to 1,158 m.

Of the two main islands, Upolu, the smaller, is the more populous. More than half of the total area of Western Samoa is suitable for cultivation, and the majority of the population live on the coastal plain. While the pre-European landscape was primarily rainforest, large areas of rainforest are now to be found only in the central mountains.

Eighty-one per cent of land is owned by families or is under customary ownership (Figure 1.1), a system which guarantees access to land for subsistence purposes, and is an integral part of the Samoan way of life (ANZDEC 1990). However, there is an increasing trend towards individual ownership of customary land.

1.2 Climate

The climate is tropical, tempered by the ocean environment, and marked by a distinctive wet season (November–April) and a dry season (May–October). Temperatures range from 17°C to 34°C. The average annual temperature is 26.5°C in coastal areas, and the average relative humidity is 83 per cent in Apia. Rainfall varies from 2,500 mm in the north-westerly parts of the main islands, to over 6,000 mm in the highlands of Savaii. The predominant surface winds are south-easterly trades during both dry and wet seasons. These patterns result in high rainfall in eastern Upolu, and rain-shadow areas in western Upolu and eastern, northern and western Savaii.

Storm patterns affecting Samoa originate from three main sources: tropical easterlies cause winds from the south-east; cold fronts from Australian systems cause cold air flows and rain; and storms from the south-west Pacific generate cyclones.

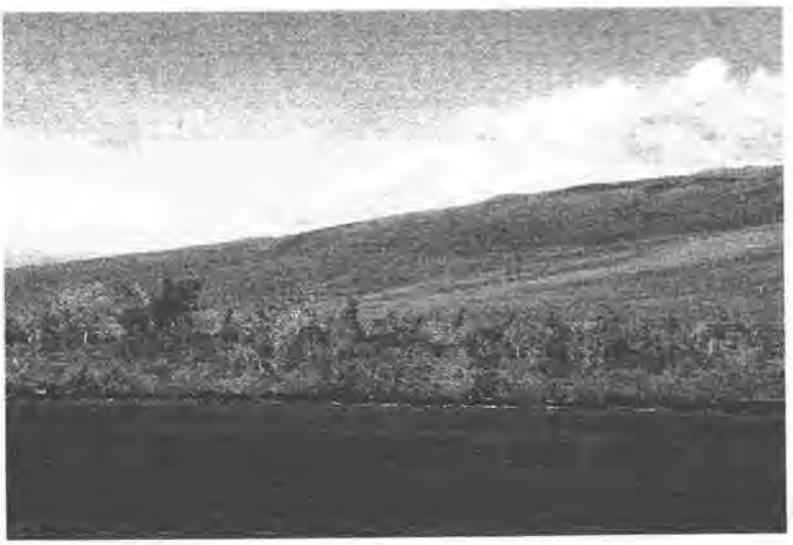
1.3 Land resources

1.3.1 Geology, geomorphology and land use

The Samoan islands are composed almost wholly of basic volcanic rocks, namely, olivine basalt, picrite basalt, olivine dolerite of the alkaline basalt suite (Kear & Wood 1959). Most of the soils are formed from basaltic volcanic flows and are generally clay in texture, free draining and relatively shallow.

The predominant land use, apart from indigenous forests, is agricultural. Flat, fertile land is now scarce in most parts of the country. This is already evident from the increased clearance of land on steeper slopes and higher altitudes that are of only marginal benefit for agriculture. The small proportion of holdings under fallow and bush is further indication of the pressure for land.

There is no mineral production in Western Samoa, except for quarrying for roads and limited landfill. An Australian exploration programme in 1990 found no useful mineral deposits except titanium which, despite its high concentrations, is not extractable at a commercially viable cost.



Savaii's central core of volcanic peaks is surrounded by a ring of lava-based plateaux. View from the north-west. (photo: A.C. Robinson, reproduced courtesy of DSLE)

1.3.2 Water

Although the average rainfall of Western Samoa is relatively high, there are areas of rain-shadow, and the high porosity of the soil creates problems for supply and storage of water.

About 70 per cent of the population have access to water drawn from surface resources; 90–95 per cent of the population have access to a piped water supply. River flows provide the main source of supply and most catchments have been extensively developed. Water catchment is also a major source of hydroelectric power. With the recent commissioning of the Afulilo hydroelectric power scheme, 50 per cent of electricity production comes from hydroelectricity.

Savaii and Upolu have many coastal springs which are used as a source of water where there is limited piped water. There is some collection of rainwater in tanks. Groundwater supplies are close to sea level and sit on a layer of salt water; as a consequence, wells are not common.

The Samoan islands are small, and despite high rainfall some of the water resources dry up for 3–6 months of the year. At this time only three major rivers run and these have been almost fully developed for water catchment. In some areas water supplies are now insufficient to meet local demand, irregular (due to a number of factors), and occasionally polluted. The construction of the Afulilo Dam destroyed one mixed swamp forest and potentially threatens the only remaining example of this ecosystem (of which only two occurred in the world). In Apia there is a high level of usage and waste, and the volume and quality of the water supply are declining due to forest clearance and cyclone damage in the water catchment areas.

Overall, the major threats to an adequate water supply are the continuing clearance in water catchment areas for plantations, and cyclone damage to the water catchments. To minimise damage, watershed management has been introduced to the Vaisigano River Catchment near Apia, and the project is now expanding to other areas. The Western Samoa Water Authority was established in late 1993.

1.3.3 Flora

In common with other islands formed by volcanic activity, Western Samoa's vegetation is derived from seeds and spores which have drifted to the islands. Seeds and spores of potential dispersers, the vast majority of which originated in South-East Asia and Melanesia, are filtered out from island to island by the expanse of ocean. Subsequent evolution in the isolation of Samoa has led to a relatively high degree of endemism.

Littoral forest near cliff forest, coastal strip near Lefaga, Upolu. The native angiosperm flora (flowering plants) of Western Samoa is the most diverse in tropical Polynesia, with the exception of Hawaii. (photo: Paddy Ryan, reproduced courtesy of MFAT)

The native angiosperm flora (flowering plants) of Western Samoa is the most diverse flora in tropical Polynesia, except for Hawaii, and is relatively well documented, although information on current status is lacking for many species.

Pre-settlement, the vegetation of the Samoan islands was predominantly tropical rainforest, but the natural environment of Western Samoa has been greatly modified.

There are nearly 500 species of native flowering plants and about 200 species of ferns in Western Samoa. About 25 per cent of the plants are endemic to Western Samoa (Whistler 1992b). Hundreds of plants have been introduced to the islands since the first Samoans brought the coconut, taro and other species for cultivation about 3,000 years ago. Today,

over half the species of plants in the country are exotic: some of these are pests on agricultural lands and in pasture; others, like the twining vine mile-a-minute (*Mikania micrantha*), invade disturbed native forest, hindering natural regeneration. Over 150 plants have been recorded as having traditional medicinal use, but this knowledge is disappearing.

A number of plant species, particularly ferns, have not been collected since the 1930s or even earlier. While there are no 'designated' endangered or threatened plant species in Western Samoa, Dahl (1986) lists 12 rare or endangered plant species while Whistler (1992b) proposes a list of 136 species that he considers potentially threatened or endangered.

The study of the vegetation of Western Samoa, although more recent than the study of flora, is well advanced. Whistler (1992a) has divided the vegetation into 19 plant communities in five broad categories: Littoral vegetation, Wetland vegetation, Rainforest, Volcanic scrub and Disturbed vegetation.

Of the land area of Western Samoa 36 per cent is still covered with indigenous forests, but considerable differences exist between Savaii and Upolu; remaining forest comprises 47 and 23 per cent of the total land areas on Savaii and Upolu respectively. Lowland forests are specifically at risk.

The current rate of forest depletion, about 3,000 ha per year, is one of the highest clearance rates in the world, and a cause for major concern. It could be considered the most serious environmental issue facing the country. The rates of depletion are similar on Savaii and Upolu, but 40 per cent of clearing on Savaii is due to logging while it is considerably less on Upolu.

The two cyclones in 1990 and 1991 also had a devastating impact. Damage to the natural forest varied, but included areas where up to 50 per cent of the forest was felled. Over large areas defoliation was estimated at 90 per cent. While tropical vegetation might be expected to be adapted to such conditions, mile-a-minute (*Mikania micrantha*) and other introduced tree and scrub species have now invaded large areas.

1.3.4 Fauna

The taxonomy of the native land mammals, birds and reptiles of Western Samoa is well known, and new species are unlikely to be found. No amphibians occur in Western Samoa. However, with the exception of a few studies, the detailed ecological knowledge vital to ensuring the long-term survival of many of these species is lacking.

In the late 1800s and early 1900s a large amount of collection and taxonomic study was carried out on the insects of Samoa, but much of the work now needs updating. The other land invertebrate group that has been studied in some detail is the land snails. Little is known about the freshwater invertebrates. Brief surveys conducted as part of the Environmental Impact Assessment of the Afulilo Hydroelectric Power Project (Winders et al. 1987, Waugh et al. 1991) noted a relatively sparse insect fauna with some very common crustacea. Western Samoa has one species of freshwater shrimp (*Macrobrachium lar*) which is of some importance in the subsistence diet. There has not been a detailed study of the native freshwater fish. The studies for the Afulilo project referred to above also noted a relatively sparse fish fauna. Four species of freshwater fish have been introduced to Western Samoa.

Reptiles

Eight skinks, five geckos and one snake (the Pacific boa *Candoia bibroni*) have been recorded in Western Samoa. Most of the lizards appear reasonably abundant and only one (the Samoan skink *Emoia samoensis*) is endemic to the Samoan Archipelago.

Birds

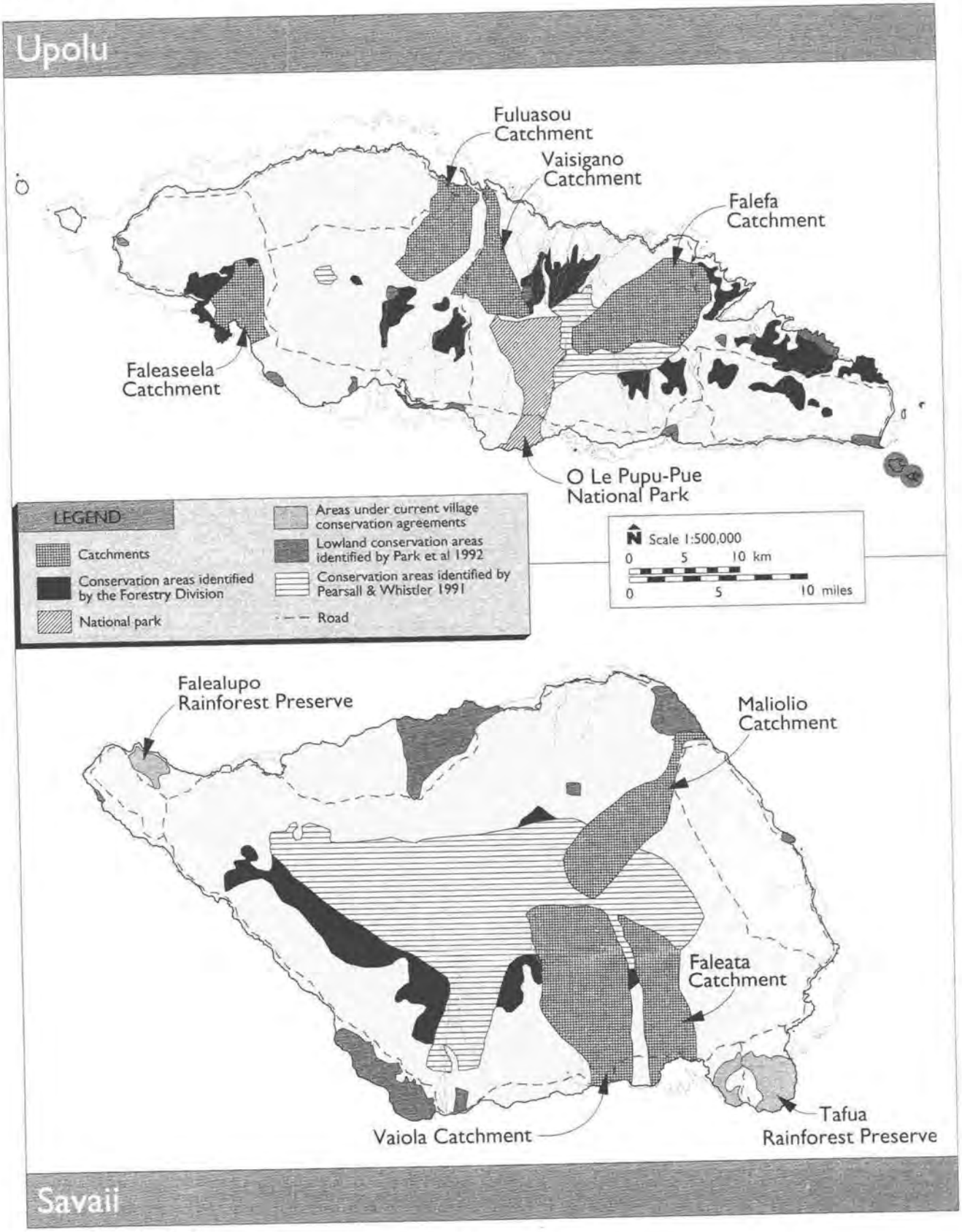
Thirty-five species of land birds and 21 sea and shore birds have been recorded for Western Samoa. Ten of the land birds are endemic at the species or sub-species level, while four species have been introduced. One native species, the 'punae' or Samoan wood rail (*Pareudiastes pacificus*), is probably extinct. Further work is needed to determine the current status of many other species as 14 are listed as "rare or endangered" (Dahl 1986).

Pigeons are a traditional food source and play an important role in Samoan tradition and customs. Pigeon numbers have declined, primarily due to the destruction of habitat, and the decline has been significantly increased by the effects of the two recent cyclones. The government introduced a ban on hunting following the cyclones and in late 1993 extended it for a further five years.

Mammals

There are 13 species of terrestrial mammals in Western Samoa and of these only three, all bats, are native: two flying foxes (or fruit bats), 'pea vao' the

Figure 1.2 Important conservation areas



Source: After GWS 1993

Samoan flying fox (*Pteropus samoensis*) and 'pea fai taulaga', the Tongan flying fox (*P. tonganus*); and 'tagiti', the sheath-tailed bat (*Emballonura semicaudata*).

The flying foxes, like the pigeons, are a traditional food source and are also important for the long-term survival of the forest as they pollinate the flowers of many species and disperse seeds of eaten fruit. Populations suffered a substantial decline from 1981 to 1988 due to an export industry to Guam. Government regulation stopped this industry in 1989. Flying fox populations declined further after Cyclone Val and traditional hunting was then temporarily banned. In late 1993 the government extended this ban for a further five years.

Of the introduced species, the early Polynesian voyagers brought 'imoa', the Polynesian rat (*Rattus exulans*), pigs and dogs to the islands. Cattle, horses, goats, cats, two more species of rats (*Rattus norvegicus* and *R rattus*) and the house mouse (*Mus musculus*) have arrived with the Europeans.

1.3.5 Conservation strategies

Recent efforts to conserve the biodiversity of Western Samoa have included the establishment of national parks and reserves by the government. Western Samoa was one of the first Pacific nations to establish a national park (O Le Pupu-Pue, in 1978) and a marine reserve (Palolo Deep, in 1979). Both are on Upolu. Private conservation covenants have also been developed for the Falealupo Rainforest Preserve and the Tafua Rainforest Preserve on Savaii, and recently at Aopo, Savaii.

Recent surveys and reviews have identified numerous sites requiring conservation (Figure 1.2) if Western Samoa is to retain a representative selection of its biodiversity (Park et al. 1992; Pearsall & Whistler 1991; Draft Forest Policy, GWS 1993).

1.4 Marine resources

The coastal lagoons and reefs of Western Samoa are a vital local resource. The latest listing of all known inshore and pelagic surface fish species lists 991 species, about 40 of which are found only in Samoa (Wass 1984). There is an unknown number of marine invertebrates.

Western Samoa is not well endowed with coral reefs. The coastline is characterised by a narrow fringing reef and a shallow lagoon, and the size of

Reefs and lagoons are an important source of local foods. However, both inshore and offshore catches have declined. (photo: Jennie Cary, reproduced courtesy of DLSE)

the fishery is small in comparison with other Pacific countries. While its Exclusive Economic Zone (EEZ) of 95,800 sq km is small, there has been limited exploitation of offshore resources. However, fish and reef and lagoon invertebrates are an important source of food. In 1989, 59 per cent of all families engaged in fishing and over 65 per cent of the catch was for local consumption (DOS/DAFF 1990).

Both inshore and offshore catches have declined, consumption of local fish is declining, and the consumption of imported, canned fish is on the increase. While it is not possible to make any valid estimates of the maximum sustainable yield for Western Samoa's varied and complex fishery stocks, it is evident from the reports of fishermen, available catch/effort data from different areas, and declines in market landings, that the maximum sustainable yield has been exceeded in most parts of Upolu (Zann 1991a). Zann has concluded that Western Samoa's reefs and lagoons are among

the most degraded in the Pacific (Zann 1991a, 1991b).

Zann (1991c) gives the possible reasons for inshore stock declines as:

(1) over-fishing due to increased demand;
(2) use of effective and modern, but non-selective, fishing techniques;
(3) use of destructive techniques such as poisons and dynamite; and
(4) loss of fish habitat through reclamation, coral sand mining and drainage.

Coastal lagoons are now also being subjected to industrial and domestic pollution. Deforestation has increased pollution of lagoons by both siltation and oversupply of nutrients. It is evident from the literature that this form of pollution is damaging the Western Samoan reef system, and contributing to the collapse of the inshore fisheries (Taylor 1991). Due to the shallowness of the lagoons, there is relatively little ocean exchange, and consequently a minimum capacity to dilute waste. The Department of Agriculture, Forests and Fisheries estimates that 90 per cent of coral reef around Apia is dead.

1.4.1 Mangroves

While mangrove scrub and forests occur on Upolu and Savaii, they are not a widespread community. Almost all sites have been disturbed to some extent by human impact. Where mangroves remain less disturbed, they provide local communities with food, house and boat construction material, and firewood.

The mangrove swamp in Vaiusu Bay is the largest in eastern Polynesia. These mangroves and wetlands are the main fish feeding and nursery habitats for Western Samoa. Until recently it was the site of the town rubbish dump and areas are still being reclaimed. The old dump is currently being rehabilitated.

1.4.2 Coral sands

Most of Western Samoa's sand reserves for construction purposes are coral sands, mined either directly from the beach or from offshore resources. Sand mining in Vaiusu Bay, the largest lagoon area in Samoa, is the main source of supplies for Apia. However, local communities throughout Samoa collect sand and coral rubble for road and house maintenance. Certain beaches close to the largest demand have chronic erosion problems resulting from overmining. While data are needed on the rate of supply of the coral sands, licences for sand mining are now being issued, stipulating conditions which will reduce coastal erosion.

1.4.3 Subsistence fishing

As mentioned earlier, 59 per cent of agriculturally active households engage in fishing and reef gleaning, and 67 per cent of households use all their catch for home consumption. Many marine invertebrates are local food sources: crabs, octopuses, sea slugs, clams and trochus shells. However, many species such as the giant clam are now rare in their natural habitat or, like the clam *Hippopus hipposus*, thought to be extinct due to over-exploitation. There are current aquaculture projects involving trochus shells, seaweeds and clams, but trochus and clam projects were severely affected by the cyclones.

1.4.4 Commercial fishing

About 1977 a new development took place in commercial fishing with the introduction of larger 'alia' (twin-hulled aluminium craft with outboard motors) under a FAO assistance programme. Fish aggregating devices were also installed. The catch from the 'alia' is primarily used in Western Samoa. Two species of tuna, 'atu' (skipjack *Katsuwanus pelamis*) and 'asiasi' (yellowfin *Thunnus albacones*), are harvested from their migrating populations.

1.4.5 Turtles

Two species of sea turtle occur in Western Samoan waters, the green turtle (*Chelonia mydas*) and the hawksbill (*Eretomochelys imbricata*). The latter is known to breed on the Aleipata islands and elsewhere. The eggs and the adults are both traditional food sources, although the numbers of both species have declined. Turtles now rarely appear in local markets.

In conjunction with an educational campaign to conserve turtles, a turtle hatchery was established in 1971, but abandoned in 1983. A revised programme of turtle management funded by the South Pacific Biodiversity Conservation Programme administered by SPREP (South Pacific Regional Environment Programme) is currently under way.

1.5 People

The preliminary results of the 1991 census according to the Department of Statistics show a total population of 161,298 people of whom 34,000 live in Apia, with the remainder in over 320 villages mainly around the coast. The overall population density is 56 persons per sq km, but as the central highlands of both islands are sparsely populated, coastal population densities in Apia reach 75 persons per sq km. Only 28 per cent of the population lives on Savaii.

While the total population grew by 41 per cent during the 1961–1991 period, growth declined during each successive intercensal period except the last. This decline is due mainly to a fall in fertility rate and the high rate of overseas migration. The high emigration rate in recent years has been a safety valve for the increasing pressure on resources, but threatens to be an unpredictable element in population planning. As well, many workers whose skills are needed in Samoa are among the emigrants.

There are strong indications that the number of emigrants may reduce, with the economic recession severely affecting the traditional destination countries for Samoans, namely Australia, New Zealand and the United States.

The traditional art of oratory is still a major cultural activity. (photo: A.C. Robinson, reproduced courtesy of DLSE)

1.6 Culture, history and government

The indigenous population is Polynesian. They comprise the majority of the Western Samoan population, and speak one language which has similarities to the language of the Tokelau Group and Tonga.

Often called "the cradle of Polynesia", Western Samoa is among the most traditional of all Polynesian societies. Its ancestors are believed to have moved into the Pacific from the South-East Asian region. The earliest known site (about 1100 BC) is at Mulifanua on Upolu, a site associated with the Lapita people who made a distinctive pottery.

While traditional arts such as weaving, 'siapo' making (cloth made from hibiscus bark), woodcarving, dancing and singing are commonly practised, it is in the tradition of oratory that the Western Samoan arts reach their highest expression. This strong oral tradition is manifest in the many legends and the practice of citing an ancestry through tens of generations.

The Samoan way of life ('faa-Samoa') is based on its social institutions (family, village council, women's committee, church) which provide direction for individual or group behaviour and responsibilities as well as overall village organisation. The 'aiga', an extended family group, remains the single most significant social and economic unit. The head of the 'aiga', the 'matai', is responsible for the care of the family and its lands, although these traditional ways are changing.

Significant contact with the Western world did not occur until the 1830s. Then began a series of encounters with Britain, Germany and the United States which culminated in the imposition of colonial rule by Germany in 1899. At the outbreak of World War I, Western Samoa was annexed by a force of New Zealanders. The New Zealand military occupation continued until 1920 when New Zealand ruled Western Samoa under a League of Nations Mandate. After World War II, Western Samoa

became a trustee of the United Nations, administered by New Zealand, and preparations began for self-government. On 1 January 1962 Western Samoa became the first of the Pacific nations to become independent.

The Western Samoan form of parliamentary government combines Samoan and Western practices. While universal suffrage was approved in 1990, only 'matai' are eligible to be elected. The Legislative Assembly is comprised of 49 members including the Speaker. Forty-seven are elected by adult universal suffrage; two representatives are elected by people of non-Samoan ancestry. At the local level each 'matai' has a place in a village council or 'fono', the governing authority in each 'nuu' (parish). The village council has wider powers than the Western-style local government. The 'fono' elects a government representative, the 'pulenuu'.

1.7 Urban and rural issues

Western Samoa is beginning to experience problems related to the disposal of wastes and the need for urban planning. No planning legislation currently exists (although legislation is being prepared). Apia exhibits overcrowding, poor segregation of industries and dwellings, traffic congestion, and other symptoms of this lack of planning.

1.7.1 Waste management

Solid waste disposal is now a growing problem. It is estimated that approximately 17,000 cubic m or 3,000 t of waste were disposed of annually at the former rubbish disposal site in Vaiusu Bay. Leachate from the dump remains a potential threat to the marine environment and to the health of consumers of seafood from the adjoining bay and lagoon areas. A new landfill site was opened in early 1993. However, it is yet to be managed for effective recycling, although it has been established to cater for this and other more progressive methods of waste management.

Increasing industrial activity and its associated nutrient-loaded liquid effluent is cause for concern, as are disused facilities which are likely sources of unmonitored chemical pollution. The disposal of hospital waste at the national hospital and district hospitals is of particular concern. A recent positive development in Apia has been the emergence of private sector interest in recycling and waste management.

In the rural area the quantities of waste produced are small but nonetheless significant. While organic waste is not generally a problem, the non-biodegradable products of the Western consumer society are increasingly prevalent. Traditional disposal practices have not adjusted to the new realities, with burning of rubbish less common than simple disposal to heaps, often inappropriately sited.

The disposal of sewage is also a growing problem. With no public sewerage system in Western Samoa, private homes are served by on-site systems varying from septic tanks with soakage facilities to primitive toilets on drains or over the sea. It is evident in the low-lying areas of Apia that groundwater is being polluted by effluent from many of

Manono Island. Although not common, over-the-sea toilets are still used in some locations. (photo: A.C. Robinson, reproduced courtesy of DLSE)

the sewage disposal facilities (GWS 1992e). And in densely populated areas, polluted groundwater, assisted by high percolation rates, is a likely contaminant of near-shore water. A study exploring options for a sewerage system for the Apia urban area was completed in late 1993.

There is also growing concern about the use and disposal of chemicals and agricultural pesticides. The high rate of suicides using weed killers shows the need for improved policies on the overall management of toxic chemicals. This issue is currently being addressed by the Pesticides Committee.

1.7.2 Climate change

Potential changes to the region's climate due to global warming are of concern to many Pacific countries including Western Samoa where the great majority of the population live within a kilometre of the coast. A research programme measuring sea-level change and other meteorological parameters is currently under way off Apia.

1.8 The economy

Like many of the small South Pacific Island nations, Western Samoa has endeavoured since independence to develop a modern economy from traditional village agriculture and primary products. Agricultural and related primary sector activities still support around 75 per cent of the population, including almost the entire rural population (Fairbairn 1993). The significance of the primary sector is indicated by the fact that related activities account for 50 per cent of the Gross Domestic Product (GDP), 60 per cent of the workforce and about 80 per cent of export earnings (World Bank 1991).

Infrastructure development, including roads, airports, seaports and communications facilities, has been extensive. However, despite huge investments in agriculture, fisheries and forestry, there has been a continuing decline in the export of primary products. The percentage of exports to imports fell from 36 per cent in 1984 to 10 per cent in 1990 (GWS 1992a). According to the Central Bank of Samoa (CBS), the current account deficit during the first half of 1992 was more than double the level for the same period in 1991 (CBS 1992).

Tourism is of increasing importance, and the Government of Western Samoa has in recent years promoted the development of light manufacturing industries. The economy is also dominated by external aid and remittances from Samoans working overseas.

1.9 Conclusions

The state of the Western Samoan environment is cause for concern. The overall trend is one of progressive decline of a way of life that is sustainable and based on indigenous natural resources. The wastes of modern throw-away lifestyles are everywhere evident, and become additional to traditional waste. Accumulation of plastics, metals and special waste are a threat to the natural environment and to public health.

The local environmental issues mirror global

The wastes of modern throw-away lifestyles are becoming more prevalent. (photo: Paddy Ryan, reproduced courtesy of MFAT)

trends, as a growing population with increased expectations and demand for economic growth competes for limited available resources. With limited funding for social services, the increase in population has affected the quality of education and health services. Many rural families seeking a better life have moved to the capital, Apia, further stretching the limited urban facilities and employment opportunities. As well, there have been indications in recent years that many Samoans affected by the economic recession overseas are returning home, thereby placing more strain on local resources. It also seems that while family planning has been official policy in Western Samoa since 1971, it is still not generally practised, due to strong religious beliefs and the perception that a large family is a socio-economic advantage.

However, in recent years and even during the period that the National Environment and Development Management Strategies document was being prepared, significant and positive activities to address such issues were undertaken by government, private and community agencies.

The challenge of the NEMS process is to respond appropriately to the environmental issues raised, decide on a national direction, and develop strategies to achieve it.

PART 2
National Environment and Development Management Strategies

Chapter 2

Introduction

2.1 Local environmental progress

The Government of Western Samoa in recent years has been committed to the protection of the local environment. There also seems to be greater public awareness of environmental issues generally.

In 1989, the Division of Environment and Conservation (DEC) was established, and combined with the former Department of Lands and Surveys to form the new Department of Lands, Surveys and Environment (DLSE). Early in 1992, the SPREP office was relocated from Noumea, New Caledonia to Apia, Western Samoa, thus placing Western Samoa at the centre of regional environmental activities.

A delegation from Western Samoa led by the Prime Minister attended the United Nations Conference on Environment and Development (UNCED) at Rio de Janeiro, 3–14 June 1992. In his address to the conference, the Prime Minister stated, "For the purpose of addressing environmental issues comprehensively, my Government is in the process of formulating a National Environment Management Strategy" (Tofilau 1992).

In March 1992, Western Samoa's Seventh Development Plan 1992–1994 (DP7) was completed. In it, much is made of environmental protection and sustainable development. One of DP7's objectives is to achieve a Gross Domestic Product (GDP) growth rate exceeding the population growth rate, and to achieve it through sustainable development. The need to carry out Environmental Impact Assessment (EIA) is recommended for all major projects. In his Foreword remarks, the Prime Minister states:

> Underlying all our policies is the concept of sustainable development. It has become evident in recent years that much apparent development, especially in agriculture, has been achieved at the expense of the long-term health of the environment. We have, in effect, been consuming our natural capital. This will stop (GWS 1992a).

Other recent local environmental measures include:

- establishment of private environmental groups such as O le Siosiomaga Society and Faasao Savaii Society;
- formulation of draft legislation for EIA;
- promotion of waste management strategies, including the development of a new landfill site for solid waste disposal to replace the former coastal site;
- establishment of the Western Samoa Water Authority (WSWA) to manage national water resources;
- establishment of a separate Ministry for Women Affairs;
- private agreements on rainforest conservation with the villages of Aopo, Falealupo and Tafua, Faaala and Salelologa;
- preparation of draft national policies on forestry and population.

The improvement of the urban environment is also a major concern. The Government of Western Samoa has proposed the establishment of the Apia Municipal Authority (AMA) to manage future development of the capital Apia, and plans are being considered for acquiring more land for Salelologa in Savaii. Specific development concepts for central Apia are proposed in the Western Samoa Tourist Development Plan 1992–2001 (GWS 1992c); and as directed by the Prime Minister at the Ground Breaking Ceremony for the new government office building, the Government will develop "plans to ensure that public services in Apia are upgraded, and amenity improved accordingly to enhance our urban physical environment" (Tofilau 1991).

2.2 The need for NEMS in Western Samoa

With increased local concern for the environment, it is important to provide a common national approach to environment and development issues. Therefore, NEMS is expected to provide the mechanism for an integrated approach to environmental management. It is expected that with better coordination, NEMS will promote a more consistent application of environmental education and delivery of information. In the DP7, there is an attempt for the first time to integrate environmental and economic issues to promote sustainable development. For the DP7 to succeed, however, it is important to develop consistent guidelines for project assessment and implementation. There is also a need to provide better costing for projects to reflect all the private and social inputs. This should lead to better distribution and use of available development capital.

At present, national policies on environmental issues are not well defined, which can lead to public confusion and uncertainty. NEMS will establish the Government's position on sustainable development, and promote clear policies to guide development programmes. NEMS will also facilitate sectoral cooperation, providing a more balanced approach to common environmental issues.

There is a need to coordinate research and data collection on local environmental issues, to ensure a systematic approach to the understanding and dissemination of information. For example, every year, a number of local students undertake research for university programmes; if given support for their fieldwork by the Division of Environment and Conservation, many may choose environmental topics.

2.3 Principles for NEMS

As a comprehensive national approach to sustainable development, NEMS aims through community participation to preserve natural capital (air, water, land and other ecological 'goods'). This requires balancing human activities with nature's ability to renew itself. It also recognises that education and economic growth are necessary to eliminate ignorance and poverty, which lead to the waste and degradation of resources.

The underlying principles for NEMS have been adapted from the Rio Declaration of UNCED (UNCED 1992). These principles, which covered both local and international issues on sustainable development, were drafted, then deliberated upon by representatives of many nations of the world. The Government of Western Samoa has given its full support to the Rio Declaration.

NEMS principles for Western Samoa are as follows:

(1) The Western Samoan citizens are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

(2) The Government of Western Samoa has the sovereign right to exploit its own resources, pursuant to its environmental and developmental policies.

(3) The right to development must be fulfilled

Village children near Salani, Upolu. Western Samoan citizens are the centre of government concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature. (photo: Paddy Ryan, reproduced courtesy of MFAT)

so as to equitably meet developmental and environmental needs of present and future generations.

(4) In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

(5) The Government of Western Samoa and all citizens (with support from other governments as deemed necessary) shall cooperate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to provide equitable standards of living and better meet community needs and aspirations.

(6) To achieve sustainable development and a higher quality of life for all citizens, the Government of Western Samoa should intervene to reduce and eliminate unsustainable patterns of production and consumption, and promote appropriate demographic policies.

(7) Environmental issues are best handled with the participation of all concerned citizens, at the relevant levels. The Government of Western Samoa shall provide easy access to publicly held information on the environment and development; encourage community participation in decision-making processes; and promote public awareness and participation by making information widely available.

(8) The Government of Western Samoa shall enact effective environmental legislation, with environmental standards, management objectives and priorities which reflect the appropriate local context to which they apply.

(9) The Government of Western Samoa shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within its jurisdiction or control.

(10) In order to protect the environment, the precautionary approach shall be widely used by the Government of Western Samoa according to its capabilities. Where there are threats of serious irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Women have a vital role in environmental management and development. The making of 'siapo', a traditional art, is also a sustainable industry. (photo: A.C. Robinson, reproduced courtesy of DLSE)

(11) The Government of Western Samoa should endeavour to promote the internalisation of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

(12) Environmental Impact Assessment (EIA), as a national planning instrument, shall be undertaken for development proposals, with due regard for the public interest and without distorting international trade and investment.

(13) Women have a vital role in environmental management and development, and their full participation is essential to achieve sustainable development.

(14) The creativity, ideals, and other attributes of youth should be mobilised to achieve sustainable development and ensure a better future for all.

(15) Traditional arts and cultural practices should be recognised and supported as an

integral part of the sustainable development process.

(16) Peace, development and environmental protection are interdependent and indivisible.

(17) Where any environment or development activities affect or involve other countries, the Government of Western Samoa shall do all in its power to:

- Ensure that these activities do not cause damage to areas beyond the limits of its jurisdiction, in accordance with the Charter of the United Nations and the principles of international law;
- Communicate its special needs in the field of environment and development, and those of similar regional nations, at international forums; and do whatever is possible to address the interests and needs of other countries;
- Cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the earth's ecosystems; and to take responsibility for any pressures placed on the global environment through local factors;
- Cooperate with other countries to strengthen internal structures for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies;
- Cooperate to promote a supportive and open international economic system which would lead to economic growth and sustainable development, and to better address the problems of environmental degradation;
- Cooperate with other countries in an expeditious and more determined manner to develop further international law for liability and compensation for adverse effects of environmental damage caused by activities beyond their jurisdiction;
- Cooperate effectively to discourage or prevent the relocation and transfer to and from other countries, of any activities and substances that cause severe environmental degradation, or are found to be harmful to human health;
- Provide urgent notification and information to potentially affected countries in the event of any natural disasters or other emergencies that are likely to produce harmful effects on the environment of those countries; and
- Resolve its environmental disputes with other countries peacefully, and by appropriate means in accordance with the Charter of the United Nations.

2.4 Regional National Environmental Management Strategies (NEMS) Project

In early 1991, SPREP secured financial support from the United Nations Development Programme (UNDP) to provide an assistance programme to Pacific Island countries aimed at strengthening in-country environmental management capabilities. The National Environmental Management Strategies Project with associated technical support, institutional strengthening and in-country training is a major component. Additional assistance has been provided by the Australian International Development Assistance Bureau (AIDAB). Seven Pacific Island countries, including Western Samoa, will benefit from this SPREP/UNDP project which commenced in April 1991.

Generally, the Strategies form a statement of the country's environmental principles, with a detailed plan for the realisation of that country's long-term goals. Management strategies are developed through the participation of the public and private sectors, non-governmental organisations (NGOs) and individual citizens.

The planning component of the Project involves:

(1) an assessment of the state of the environment, and identification of critical environmental problems;

(2) a review of existing legislation, examining any problems in implementation;

(3) a review of institutional capabilities

recommending any necessary institutional strengthening;

(4) development of environmental management strategies which address the priority environmental problems and issues; and

(5) recommendations on environmental programmes to support the National Environmental Management Strategies.

The training component involves:

- short-course training focusing on EIA and other training requirements identified by the Task Team; and
- on-the-job training aimed at government officials and members of NGOs.

Chapter 3

Framework for NEMS

3.1 Approach

At the first meeting of the Task Team in November 1991, it was agreed that NEMS for Western Samoa should cover the "total environment". That is, the strategies should address all the issues related to the natural, physical, social and economic environments. There was general consensus that as environmental issues are interrelated, NEMS must deal with all environmental aspects if it is to provide a comprehensive, national approach to environmental management.

During the third meeting of the Task Team in September 1992, the NEMS approach adopted was one based on key environmental issues, rather than a sectoral approach. The latter tends to pursue sectoral interests and to treat their impacts on other sectors as side-effects. It was decided by the Task Team that Target Environmental Components (TECs) must be the NEMS focus, including setting goals and objectives to address the problems associated with them. The sectors that are related to and/or affected by each TEC will implement activities, and monitor progress to achieve the TEC objectives. These intersectoral connections will create patterns of environmental interdependence and cooperation which are vital to the success of NEMS.

The following TECs were identified and confirmed as the main issues to be addressed in NEMS.

(1) Management of population dynamics and trends
(2) Protection of the quality and supply of fresh water
(3) Protection of the sea and marine resources
(4) Management of waste
(5) Combating deforestation
(6) Development of appropriate land use practices
(7) Conservation of biological diversity
(8) Protection of the atmosphere
(9) Planning for climate change
(10) Preservation of traditional arts, culture and history
(11) Development of human resources
(12) Promoting sustainable economic growth

3.2 Goals

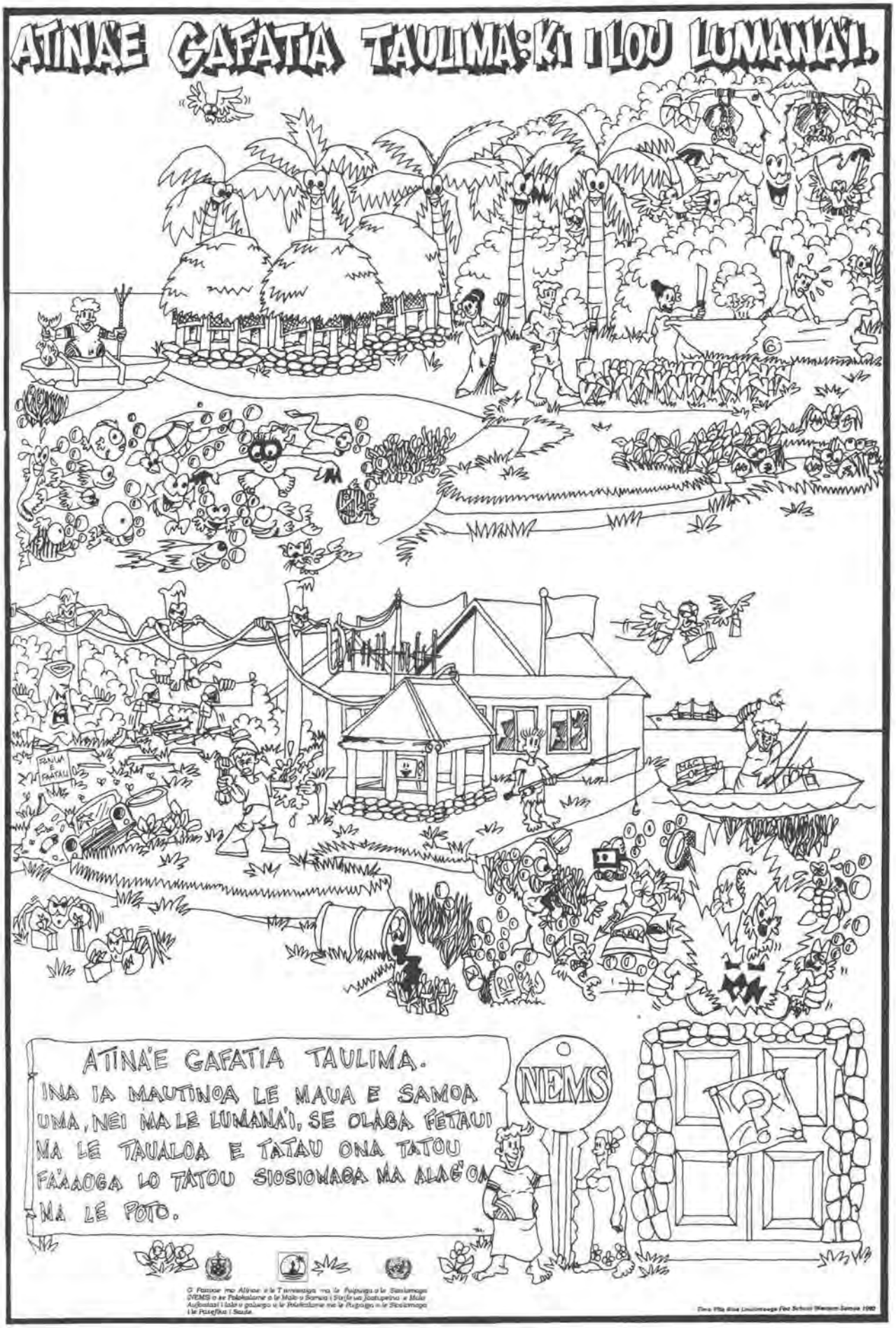
NEMS long-term goals are the improvement of the welfare of all Samoan citizens and the realisation of community expectations through sustainable development by means of:

- stabilising population;
- boosting efficiency;
- restraining consumption; and
- building a framework for change.

Figure 3.1 Environmental awareness poster

Facing page: Public awareness is an important component of the National Environment and Development Management Strategies.

Entitled "SUSTAINABLE DEVELOPMENT: THE KEY TO YOUR FUTURE", this poster in the Samoan language promotes sustainable development — "To ensure that all Samoans, both now and in the future, have an acceptable and dignified way of life means that we must use our environment and our resources wisely" (artwork: Timo Pita Atoa, Leulumoega Fou School of Fine Arts, 1993, production funded through SPREP as part of the NEMS publicity campaign)


ATINAE GAFATIA TAULIMA: KI I LOU LUMANA'I.
ATINA'E GAFATIA TAULIMA.
INA IA MAUTINOA LE MAUA E SAMOA UMA, NEI MA LE LUMANA'I, SE OLAGA FETAUI MA LE TAUALOA E TATAU ONA TATOU FA'AAOGA LO TATOU SIOSIOMAGA MA ALAGA MA LE POTO.
NEMS

Sustainable development allows progress and growth without risking constraints from overpopulation, resource depletion and ecological breakdown. It is defined as a process in which:

> . . . the exploitation of resources, the direction of investment, the orientation of technological development and institutional change, are all in harmony and enhance both current and future potential to meet human needs and aspirations (World Commission on Environment and Development 1987).

Alternatively, it means:

> . . . using, conserving, and enhancing the community's resources so that ecological processes on which life depends, are maintained, and the total quality of life now and in the future can be increased (Commonwealth Government of Australia 1990).

The demand for natural resources, and their subsequent depletion and/or degradation, is directly related to the number of people competing for those resources. Therefore, continued population growth will place tremendous pressures on limited available resources, and ultimately jeopardise the livelihood of all citizens. Stabilising population involves the improvement of community primary health care, standards of living, and the status of women. It also means making family planning and counselling services widely available to help lower birth rates and achieve sustainable population growth.

Boosting efficiency involves the adoption of practices and measures that will reduce the resources used, or pollution generated. These include less destructive agriculture; waste recycling; more efficient wood-burning cookers; renewable energy; and more efficient vehicles.

Restraining consumption involves developing lifestyles that lower the burden on the environment, and creating more realistic community expectations through public education and awareness programmes. It also scrutinises consumer goods more carefully, promotes 'green consumerism', and encourages self-reliance.

Building a framework for change is the main component of the sustainable development process. In less developed countries like Western Samoa, it is often very difficult to change entrenched attitudes and old habits. The majority of the population who live in rural areas seem more involved with survival from one day to the next than with long-term schemes which will provide no immediate visible gains to them as individuals. Often, decision makers seem to lack the political will to promote long-term goals which may not provide immediate electoral advantages. But for NEMS to have any chance of success, it is important to articulate the mechanisms of a framework for change, and for the planning and implementation of NEMS to operate within that framework. Details of a NEMS framework for change are discussed in Chapter 4.

3.3 Scope

The requirements for SPREP's regional project, as discussed in Section 2.4, need to be considered in the local context. Because of Western Samoa's particular stage of environmental development, it is most important to provide a step-by-step framework so that the required 'ground rules' are set and approved from the very start. This will require substantial public awareness and understanding of the issues involved, and clear commitment by decision makers to any proposed environmental policies and/or activities.

For instance, on the question of the adequacy of existing legislation, there is a need first to define the issues to be legislated on, especially the end results that are expected to be achieved from such laws. This will involve a consideration of control, incentive, and trade-off options, seeking political approval, setting standards for compliance, and assessing the costs involved to monitor compliance. Likewise on the question of environmental management strategies, many different sectors must be consulted, each with different requirements for national strategies. In the absence of any integrated national policies on environmental issues, the above problems will be difficult, if not impossible, to address on a case-by-case basis.

Therefore, to provide for an orderly development of Western Samoa's NEMS, it is proposed that it be carried out in three phases.

Phase 1

This sets out the framework for NEMS. It provides the philosophy and future direction on environment and development, as well as guidelines for policy formulation and implementation. The provisions of Phase 1 should be approved by the government before Phase 2 can start.

Phase 2

This phase involves the formulation of national policies for each of the TECs given in Section 3.1. In the absence of specific environmental 'ground rules', it is paramount that related policies setting out national priorities and sectoral responsibilities are approved for each TEC. It is expected that for each TEC, the sectors involved or with interest in it will set up a Policy Committee to facilitate policy preparation. For example, those to be involved in a policy on water resources should include representatives from the Western Samoa Water Authority (WSWA), Health Department, Department of Agriculture, Forests and Fisheries (DAFF), Education Department, and the Department of Lands, Surveys and Environment.

As the national policies will guide future development on the TECs, it is most important to encourage and solicit wide public participation during policy formulation. As these policies will guide future public activities, the community must be part of this consultative process. The politicians should also be involved and well briefed in order to gain their support and endorsement.

The general format for the national policies is discussed in detail in Chapter 7, and is as follows:

(1) Introduction
(2) Policy goals
(3) Objectives and activities
(4) Implementation
(5) Evaluation
(6) Conclusions
(7) References
(8) Attachments

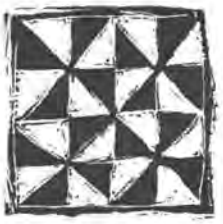
Phase 3

This deals with policy implementation. With policy approval, Phase 3 will draw up action plans; implement activities to achieve objectives; monitor progress; and review performance. This is the continuing phase of NEMS, which is subject to regular evaluation and review, and should be flexible to accommodate new information and experience. The other important aspect of Phase 3 is the promotion of ongoing community education and the creation of improved public awareness.

3.4 Structure of the report

The rest of this report looks at the other requirements for Phase 1. Chapter 4 develops the concepts of change and suggests a framework in which it can develop. Chapter 5 discusses the current status of the various TECs, based on available information and local studies. Chapter 6 recommends for each TEC the main policy objectives, with activities to achieve those objectives. Chapter 7 looks at the implementation framework for NEMS, not only for each policy, but also for NEMS overall coordination and administration.

Chapter 4



The process of change

4.1 General

As discussed in Section 3.2, the process of change is the key component for sustainable development. It is also the most difficult to address as it involves the attitudes, perceptions and personal prejudices of individuals, all of which are driven by their educational and life experiences. The understanding of change can be as diverse as the number of people in any society. It is also a political concept as it will influence decision making and promote the development of new power structures, on which the future of the nation depends.

For NEMS to succeed, the community must change from the wasteful practices now in common use, and adopt more efficient alternatives. For example, clearing forests on steeper slopes can lead to soil erosion and the loss of other environmental 'treasures'. But how can rural families necessarily manage when there is limited good land available? Or change when shifting agriculture is the only method of cultivation they know, and can afford to use? The process of change will obviously involve a change in social and economic attitudes and actions. It will require a change in people's lifestyles. The whole philosophy that guides their lives must therefore change.

Thus, the process of change must involve the whole community, and the three components of this process (the three As of Change) are Public Awareness, Agenda Setting and Community Action.

Awareness + Agenda + Action → Change

Public awareness and education, as mentioned earlier, are important functions in policy formulation and implementation. As will be seen in Chapter 6, each policy sets objectives and activities which, if approved by the government, will become the environmental agendas for the country. Good agendas will remain good intentions only unless they are translated and put into practice through community action and participation.

4.2 Public awareness

For the majority of the general public, awareness of environmental issues cannot be taken for granted. It will have to be created through ongoing programmes, using both formal and informal avenues. For many of the people in the rural areas with limited educational background, it is a mammoth task to help them appreciate sustainable development issues, especially if there is a cost to them in the short term.

Public awareness is a key element in all TEC national policies. While standard means of communicating ideas are encouraged through the press, radio and public meetings, public awareness in the long term may be best achieved through formal environmental education. This will use the normal education and health systems by incorporating environmental programmes in school curricula and adult education, and by promoting sustainable development issues through primary health care activities.

Information should be presented in ways that are relevant to people's lives, with plenty of visual demonstrations and displays. For instance, family planning, while still a sensitive local issue, should be dealt with in terms of the number of people to feed and clothe, school fees to pay, and land required for agriculture and buildings. Water pollution should be interpreted in terms of lack of hygiene, sickness from drinking dirty water, and the shortage of supplies. Dynamiting fish should be presented not only as foolish, but as a serious

Environmental education is needed to change attitudes. School children in Apia carry a World Environment Day banner during Independence Day celebrations. (photo: Paddy Ryan, reproduced courtesy of MFAT)

criminal act. Dynamiting kills all nearby marine life and damages community fishing grounds. Public education should also be presented in such a way as to promote dialogue and discussion, rather than a lecture-like approach.

4.3 *Agenda setting*

Agenda setting in this context is a direct function of political leadership. It is impossible to underestimate the importance of quality leadership to provide better plans, muster sound arguments, and establish agendas for better policies and equitable community service. New programmes should be based on sound and convincing arguments, and increased public input be sought during the formulation and planning of national development programmes. Any significant community change will require quality leadership as its very foundation.

In NEMS, it is hoped that the nature and direction of government support for environmental protection will be reflected in the proposed national policies. This will involve a commitment to create public awareness, improve knowledge and understanding, set standards for resource utilisation, and provide support for related activities to ensure their success.

Local conflicts regarding the impact of environmental policies already exist in Western Samoa. A good example is the question of land use. While the Department of Lands, Surveys and Environment and the Department of Agriculture, Forests and Fisheries are advocating less destructive agricultural practices, farmers believe that they should develop their own land in any way that suits them or they can afford. There is no government control over land use or forest clearance.

In such cases, the government must intervene to provide overall guidelines. This is the philosophy on which the whole principle of land use planning and environmental control is based. If each individual pursues his or her own interests only, the interests of other members of the public will be affected, since all will suffer the effects of water contamination, soil erosion and the pollution of lagoons.

4.4 Community action

In any democracy, real progress relies on lifting public expectations about what government and community action can achieve. The community must take charge of its environment to determine appropriate action. Every effort should be made to ensure that resources, especially public goods, are used efficiently. Government support for community activities (through controls and/or incentives) is most important as it provides official sanction and credibility, gives official recognition, and is likely to attract funding for private projects.

In NEMS, community action will be most reflected in the implementation phase (Phase 3), in the design of projects to achieve objectives. There is no better way to effect environmental action than through local community networks, and traditional implementation structures already exist which can be developed and/or strengthened. For example, there are the family units, churches, women's organisations, youth groups and the village councils. However, in planning projects it must also be remembered that Samoans are largely 'individualistic' with the extended family as their primary arena of interest. Their sense of community seems to emerge primarily in those areas where group involvement is advantageous to them and their families.

Community action will be based on the Samoan sense of fair play and give-and-take. This can be illustrated in village food distribution where the distributor must share the goods evenly or risk ridicule and being branded as greedy. It will also be based on the Christian principle of 'doing unto others what you want others to do unto you'. Community action will also be based on clearly defined roles for different groups. In Samoan society this is another element which provides security, since individuals know exactly what their roles and functions are.

At present, there are many instances in which for one reason or another the community is unable to respond to critical environmental issues affecting their lives. For example, in some villages, everyone knows who is using explosives to catch fish, at a great risk to themselves and the marine environment. However, there is very little community outcry against the culprits. Likewise, some communities are well aware of landowners clearing land, planting crops and using pesticides in catchment areas above their water supply intakes. Yet there are few instances of community action against such people, although in effect they are systematically poisoning the community water supply source.

The community needs to be empowered to speak up and make a stand against such destructive actions that will ultimately affect everyone. The offenders should be confronted and held responsible for their actions. They should not be allowed to take public apathy as an endorsement of their irresponsible activities. The community must feel strongly that it is neither just nor fair for a few individuals to destroy their common heritage.

Current status of the local environment

5.1 Population issues

As mentioned earlier, the population of Western Samoa from the preliminary results of the 1991 Census of Population and Housing is 161,298 (DOS 1992). The most significant feature of the population structure as shown in previous census results is the high proportion of those under 15 years. In 1971 this was as high as 50 per cent (DOS 1981). However, as shown in Table 5.1, it fell during 1976–1986 from 48 to 41 per cent, due to a decline in fertility and high overseas migration.

Between 1906 and 1986, the population increased more than fourfold from 37,320 to 157,408, representing an average annual population growth rate of 4.0 per cent (DOS 1986). But, as shown in Table 5.2, for the intercensal period 1982–1986, the net out-migration rate increased from 16.7 per 1000 to 28.0. Therefore, despite the stable high birth rates and declining death rates, the high emigration rates resulted in a net decline in population growth rate during the same period.

There are strong indications that the number of emigrants may be declining, with the economic recession badly affecting the traditional overseas destination countries for Samoans, namely Australia, New Zealand and the United States. Figure 5.1 shows population projections for three different annual growth rates. The first scenario is the annual growth rate of 0.6 per cent given by DOS; the second is the estimated growth rate of 1.06 per cent published by the South Pacific Alliance of Family Health (SPAFH 1991); and the third is the current estimated natural growth rate of approximately 2.0 per cent. According to the latter, if the safety valve of emigration is tightened, the 1986 population will double by the year 2021.

There are three main issues of concern to Western Samoa if the national population is allowed to grow at the current rates. These are identified in the Draft Population Policy as:

(1) limited land resources;
(2) depletion of other natural resources; and
(3) strain on existing economic and social infrastructure (GWS 1992b).

Table 5.1 Population structure, 1976–1986

	1976		1981		1986	
Age	Total	% Pop.	Total	% Pop.	Total	% Pop.
0–4	24,646	16.2	22,866	14.6	21,859	13.9
5–9	24,973	16.4	22,848	14.6	21,023	13.4
10–14	23,627	15.6	23,525	15.0	21,713	13.8
15–19	18,552	12.9	20,896	13.4	21,135	13.5
20–44	39,081	25.7	43,700	28.0	48,271	30.7
45–64	15,607	10.2	16,880	10.8	17,761	11.3
65+	4,497	3.0	5,626	3.6	5,396	3.4
Total	150,983	100.0	156,341	100.0	157,158	100.0

Source: DOS 1986

Table 5.2 Population vital statistics for the intercensal period, 1982–1986

Year	Birth rate*	Death rate*	Net out-migration rate*	Annual population growth rate (%)
1982	31.0	7.4	16.7	6.9
1983	31.0	7.4	16.7	6.9
1984	30.5	6.3	28.0	–3.8
1985	30.0	5.2	24.3	0.5
1986	29.5	5.0	28.0	–3.5

* per 1,000 population

Source: DOS 1986

In order to maintain a high standard of living with all the amenities of civilisation, it is estimated (based on total available agricultural land and human needs) that the optimum population for Western Samoa is 130,000 people (Marshall 1950). The effects of reduced international migration and the likelihood of some unemployed Samoans returning home will exacerbate the local demand for limited resources.

The country's Fourth Five Year Development Plan recognised that family planning, though agreed to in 1971, was not integrated with economic, environmental or social development objectives (GWS 1980). More than thirty years later it seems that the same is still true. Therefore, the main options related to population issues are (1) the integration of demographic dynamics into national development planning, and (2) the attainment of a national population growth rate that available resources can sustain.

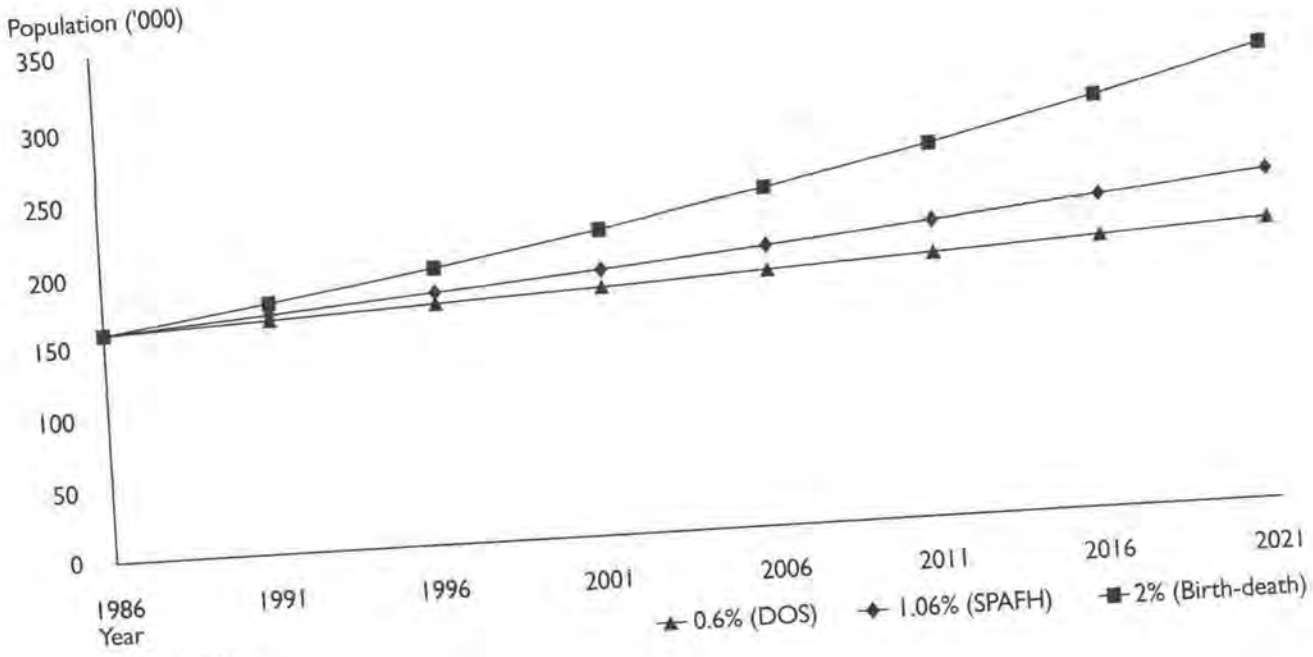
5.2 Water supply

Current strategies for the development of the water sector include measures to:

(1) promote watershed management;
(2) harvest rainwater;
(3) develop a national master plan;
(4) provide effective cost recovery;
(5) develop the new water authority; and
(6) create public awareness (GWS 1992d).

About two-thirds of the population now have access to water drawn from surface resources, the other third relying on borewater or rainwater. Samoans regard water as God's gift and therefore expect that it will be free. This has led to over-exploitation and inefficient use of existing supplies. For example, the normal requirement for

Figure 5.1 Population growth projections



Source: GWS 1992b

Sopoaga Falls, Upolu. Despite a high rainfall in parts of Samoa, only a few major rivers run all year round. Continuing land clearance is a major threat to the ability of the catchment areas to hold water. (photo: A.C. Robinson, reproduced courtesy of DLSE)

water is 250 litres per person per day. In the Apia area, current use is 600 litres per person per day.

Except for a few major rivers that run all year round, all surface water sources dry up for three to six months. This is due largely to the high permeability of younger rock formations (Kear et al. 1979). However, cyclone damage and the continuing land clearing for agriculture are now the major threats to the ability of catchment areas to hold water. Despite government efforts to protect catchment areas, large parts of most catchments have already been cleared for plantations. To minimise damage to catchment areas, watershed management has been introduced to the Vaisigano River Catchment, and the government has agreed to take over all river catchment areas.

Table 5.3 shows the funding allocations for water supplies. Only about 10 per cent of local expenditure is recovered annually from consumers, which highlights the absence of appropriate policies for effective cost recovery. Boreholes are expensive to develop, costing about $1,000 per metre to drill, and 20–40 'sene' per cubic metre to operate, depending on the bore depth. However, water is supplied virtually free to local consumers at about one 'sene' per person per cubic metre, compared to 83 (US) cents per person in Hawaii, plus an initial fee of $US 7,000 for every new connection.

Table 5.3 Local funding for water supply ($'000)

Item	1988	1989	1990
Expenditure			
Recurrent	1,294	1,025	1,780
Development	3,489	844	1,266
Total	4,783	1,869	3,046
Revenue	211	189	305

Source: PWD 1991

While considerable funding has been allocated under European Community economic assistance (Lomé IV) for water supply development, this is subject to the completion of a national master plan. Such a plan will guide future development of the water sector, especially the effective management of available resources and including the impacts of hydroelectricity generation. Through the new water authority, the main issues for water resources are the protection of supplies and the sustainable provision of clean water to all consumers.

5.3 Fisheries

While it is not possible to make any valid estimates of the maximum sustainable yield for Western Samoa's varied and complex fishery stocks, it is evident from the reports of people who fish, available catch/effort data from different areas, and declines in market landings that the maximum sustainable yield has been exceeded in most parts of Upolu (Zann 1991a). A decline in fish stocks is probably responsible for the decline in inshore landings in Upolu.

Zann (1991c) gives the possible reasons for inshore stock declines as:

(1) overfishing due to increased demand;
(2) use of effective and modern, but non-selective, fishing techniques;

Land reclamation, Vaiala. The continuing reclamation of lagoons and mangroves is just one of the threats to the fisheries resources of Samoa. (photo: Jennie Cary, reproduced courtesy of DLSE)

(3) use of destructive techniques such as poisons and dynamite; and
(4) loss of fish habitat through reclamation, coral sand mining and drainage.

A good example of habitat depletion was the use, until recently, of the mangrove swamp at Vaiusu Bay as the town waste disposal site. This is the largest area of lagoon in Western Samoa, and contains the largest mangrove and wetlands area in eastern Polynesia.

Coastal lagoons are also being subjected to industrial and domestic pollution. Deforestation has increased the incidence of soil and nutrients being washed to the sea. These can result in eutrophication and changes to ecosystems, and sediments may even kill the reef (Warren & Sisarich 1992).

It is evident from the literature that sediment and nutrient pollution of lagoons is damaging the Western Samoan reef system, and contributing to the collapse of the inshore fisheries (Taylor 1991). Due to the shallowness of the lagoons, there is little ocean exchange, and thus a minimum capacity to dilute waste. The Department of Agriculture, Forests and Fisheries (DAFF) estimates that 90 per cent of the coral reef around Apia is dead.

The future options for local fisheries lie in (1) the protection and conservation of coastal lagoons and habitat, and (2) replenishment of stocks through the development of stock hatcheries. For example, the turtle hatchery project established at Aleipata in 1971 was an attempt by the Fisheries Division of DAFF to increase survivorship of young turtles (Zann 1991b). The hatchery was closed in 1983.

5.4 Waste management

Very little is known about the amount of solid waste being generated nationwide. This is because there is no public collection in the rural areas, and the collection in Apia only covers part of the urban area. It is estimated that approximately 17,000 cubic m or 3,000 t were disposed of annually at the former site at Vaiusu Bay which, as mentioned earlier, was located in the mangrove area west of Apia. The working face at the disposal site was about 270 m long and 30 m wide, and all rainfall runoff from the site still discharges directly into the bay. With no control over leachate or the types of waste being disposed of there, there are serious threats to both the marine environment and the health of consumers of seafood from the adjoining bay and lagoon areas. A new landfill site has now been opened for urban waste disposal.

The disposal of sewage is also a growing problem. With no public sewerage system in Western Samoa, private homes are served by on-site systems which can be classified into (1) septic tanks with soakage facilities; (2) pour-flush toilets; (3) pit latrines; and (4) primitive toilets on drains or over the sea. It is evident in the low-lying areas of Apia that groundwater is being polluted by effluent from many of the sewage disposal facilities (GWS 1992e). And in densely populated areas, polluted groundwater, assisted by high percolation rates, is a likely contaminant of near-shore water.

There is also growing public concern about the use and disposal of chemicals and agricultural pesticides. In 1989 during the Agricultural Census,

nearly 60 per cent of families reported using agricultural chemicals (DOS/DAFF 1990). The high rate of suicides using weed killers shows the need for improved policies on the overall management of toxic chemicals. Hospital waste disposal was of concern. The hospital sewage treatment plant was replaced in 1992 by a new and effective facility, although effluent quality has suffered from maintenance and management difficulties.

Future options for waste management include (1) to reduce, recycle and recover resources from solid waste; and (2) to provide proper treatment and disposal facilities for solid waste. In 1991, the government approved a new 40-hectare site for a sanitary landfill. The Department of Lands, Surveys and Environment is currently developing the new site. Plans are also being considered for the rehabilitation of the former site, particularly to improve the mangrove swamp areas, and to discourage any further degradation by nearby residents. Feasibility studies for a sewerage scheme for Apia have been undertaken, but funding for its construction appears remote.

5.5 Forestry

The total land area of Western Samoa is 698,941 acres or 282,852 ha. Of this, 37 per cent is covered by remaining forest (36 per cent indigenous, 1 per cent plantation). Figure 5.2 shows the breakdown of forest areas between Upolu and Savaii. The remaining forest comprises 47 and 23 per cent of the total land areas on Savaii and Upolu respectively. DAFF (1992) estimates that of the remaining indigenous forest, only 5 per cent is merchantable while 31 per cent is non-merchantable.

The Department of Agriculture, Forests and Fisheries also estimates that the current rate of forest depletion is about 7,500 acres (3,000 ha) per year. The rates of depletion are similar on both Savaii and Upolu but 40 per cent of clearing on Savaii is due to logging while there is less logging on Upolu. Overall, 20 per cent of forest clearing is attributed to logging with the remaining 80 per cent resulting from agriculture and other activities (DAFF 1992).

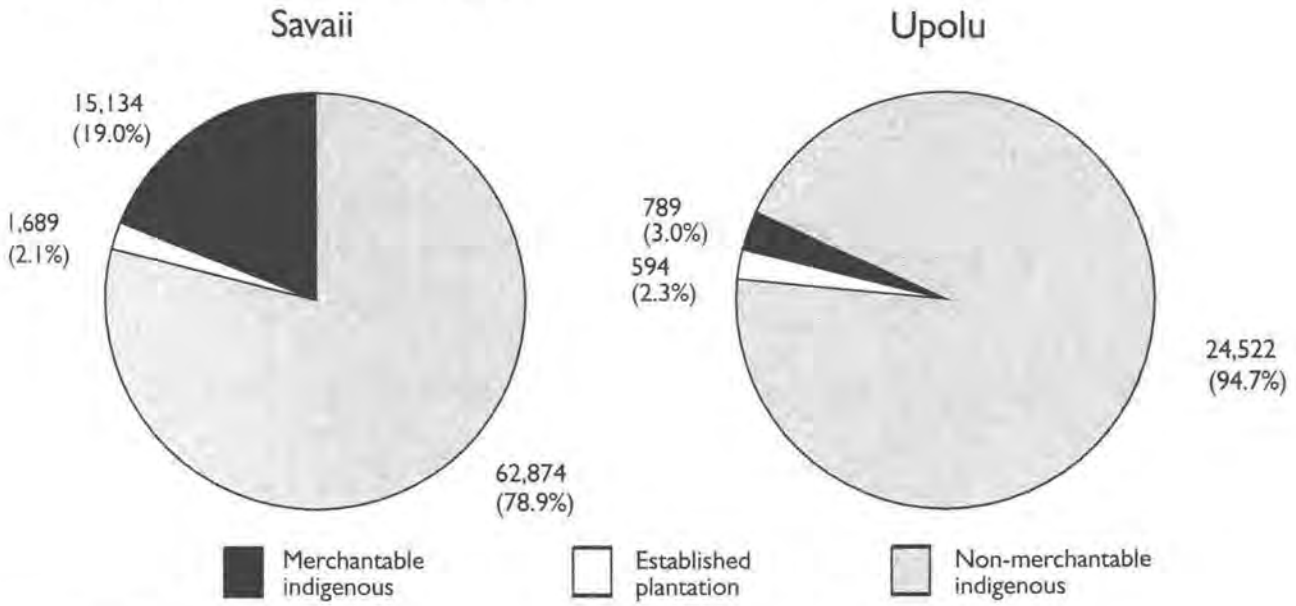
The most important functions of forest are:

(1) to protect and conserve the environment (including soil, water and biodiversity resources);
(2) to produce wood and other forest products; and
(3) to provide recreation and tourism opportunities (GWS 1991b).

Paid employment in the forestry sector currently supports 10 per cent of the labour force.

With deforestation having wide ramifications

Figure 5.2 Remaining forest areas (ha)



Source: DAFF 1992

Almost eighty per cent of forest clearance is for agricultural purposes. Here, taro is being grown amongst felled logs. (photo: Paddy Ryan, reproduced courtesy of MFAT)

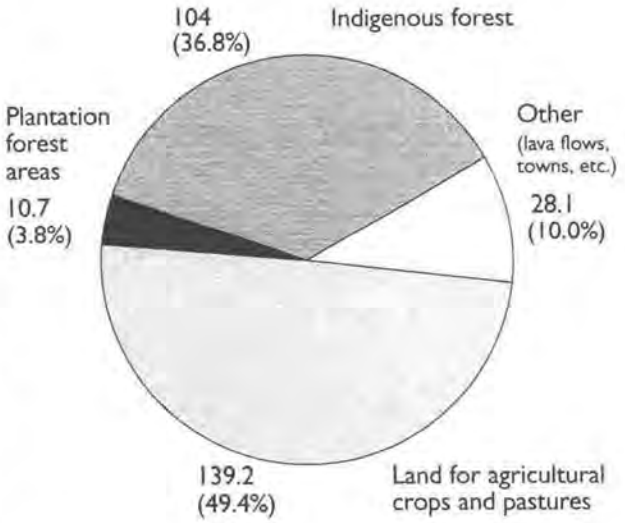
for most other aspects of the environment, sustainable forest management is seen as one of the most pressing issues in environmental protection. Two options are proposed (GWS 1991b) for future development of indigenous forest. One is for a perpetual log cut of 1,000 cubic m per year, and the other an annual cut of 10,000 cubic m per year until plantation forests become available in approximately the year 2010.

5.6 Land use

The majority of land is owned by families or is under customary ownership, as shown in Table 5.4. This system guarantees access to land for subsistence purposes, and is an integral part of the Samoan way of life. However, customary ownership of land can be a constraint for certain types of economic activity, and is seen by some as an impediment to development (Hardin & Associates 1989). For example, for extensive agricultural or forestry development with heavy investment in fixed assets, long-term security of tenure is necessary. However, Fairbairn (1985) concludes that the economic future of Western Samoa depends essentially on progress in the subsistence sector.

Apart from indigenous forests, the other most important land use in Western Samoa is cropping,

Figure 5.3 Estimate of land use, 1991 ('000 ha)



Source: GWS 1993

Table 5.4 Land ownership

Type	Upolu		Savaii		Total	
	ha	%	ha	%	ha	%
Customary	76,166	27	153,490	54	229,656	81
Government	19,758	7	10,626	4	30,384	11
WSTEC	9,499	3	4,476	2	13,975	5
Freehold	7,800	3	1,037	(a)	8,837	3
Total	113,223	40	169,629	60	282,852	100

Source: GWS 1991a

(a) Insignificant

as shown in Figure 5.3. The most important crop is coconuts followed by taro and cocoa. In livestock, cattle are most important with 14 per cent of families keeping them (DOS/DAFF 1990).

The appropriate utilisation of land resources according to their capabilities holds the key to future land use management (Table 5.5). At present, most cropping and livestock development takes place in areas suitable for agriculture, but it is estimated that over 30 per cent of total agricultural and forest activities takes place in areas with severe limitations. With plantation access roads opening up many inland areas, over 42 per cent of the indigenous forests in sensitive areas have been cleared for agriculture and forestry (ANZDEC 1990).

Table 5.5 Land use capability

Capability type	Proportion (%)
Land with few limitations to agriculture	14
Land with moderate limitations to agriculture and few limitations to forestry	43
Land with severe limitations to agriculture and moderate to severe limitations to forestry	21
Land unsuitable for agriculture or forestry	22

Source: After ANZDEC 1990

5.7 Biodiversity

In 1948 Gratton reported Samoa as "a very fine field for the botanist and entomologist"; Samoan biodiversity in 1893–1895 was evidenced by "567 botanical genera and 1,244 species, and among these 142 were new". Of the 52 kinds of birds, 34 were land birds, and of the latter, 16 were found nowhere else in the world (Gratton 1948). Jordan and Seale (1906) described the fish fauna of Samoa as the richest on the globe, and obtained specimens of 475 species, of which 92 were considered at the time to be new to science. The fauna is now known to contain 991 species, about 40 of which are found only in Samoa (Wass 1984).

More recently, Whistler (1992a) estimated that Western Samoa supports about 500 vascular plant and 245 fern species, of which 30 per cent are found nowhere else. Dahl (1986) identified 21 butterfly species of which one is found nowhere else. Gill (1993) identified 14 reptile species (eight skinks, five geckos and a snake), and three of the skinks are species restricted to Western Samoa and a few nearby islands. Pratt et al. (1987) recorded 37 resident land birds, ten of which are found nowhere else. However, increased demand for local resources is aggravating pressure on natural ecosystems, and threatening the survival of existing biodiversity.

A number of plant species, particularly ferns, have not been collected since the 1930s or even earlier. Whistler (1992b) has prepared a list of potentially endangered or threatened plants which includes 137 species. With the destruction of much of the natural environment, many species of plants and animals must be at the brink of extinction.

Vaipu mixed swamp forest, Upolu, one of only two such ecosystems in the world. One was destroyed for the construction of the Afulilo hydroelectricity dam, and this area is under threat despite its high biodiversity values. (photo: Paddy Ryan, reproduced courtesy of MFAT)

The main option for future action is to encourage and support community efforts for long-term conservation of those remaining areas supporting unique biodiversity. The linkages between various ecosystems and the requirements of different species should also be firmly established and understood so that the full potential of existing biodiversity can be protected and realised. To safeguard the basic range of natural ecological diversity, Park et al. (1992) identified fourteen key sites throughout the coastal lowlands (Figure 5.4) as the very minimum to protect:

(1) Uafato–Tiavea coastal forest, Upolu.
(2) Sataoa–Saanapu coastal wetland (mangrove forest), Upolu.
(3) Nuutele, Nuulua, Fanuatapu (Aleipata islands), Upolu.
(4) Aopo–Letui–Sasina coastal forest, Savaii.
(5) Vaoto lowland forest, Savaii.
(6) Apolimafou coastal wetland.
(7) Saleapaga–Lalomanu coastal forest, Upolu.
(8) Vaiee–Tafitoala peninsula, Upolu.
(9) Vaipu swamp forest, Upolu.
(10) Taga–Lata–Salailua lowland forest, Savaii.
(11) Siuvao Point forest, Savaii.
(12) Mulinuu–Tufutafoe coastal wetland, Savaii.
(13) Mauga–Samalaeulu lava flow succession and forest islands, Savaii.
(14) Maliolio River forest, Savaii.

Pearsall and Whistler (1991) also identified key highland areas for conservation including:

(1) Lona–Punataemoo forests, Upolu.
(2) Fusiluaga forest, Upolu.
(3) Highlands of Savaii.
(4) Central Upolu uplands.
(5) Eastern Upolu uplands.
(6) Mt Fao rainforests, Upolu.

5.8 Atmosphere

Although Western Samoa is a party to international conventions to protect the atmosphere, there has been limited local response to this issue to date. The area of most concern is the emission of carbon dioxide and other ozone depleting gases from vehicles and industrial plants. Future actions should include: (1) improved standards for vehicle testing; (2) appropriate pricing for petroleum products; and (3) incentives to encourage the use of renewable forms of energy.

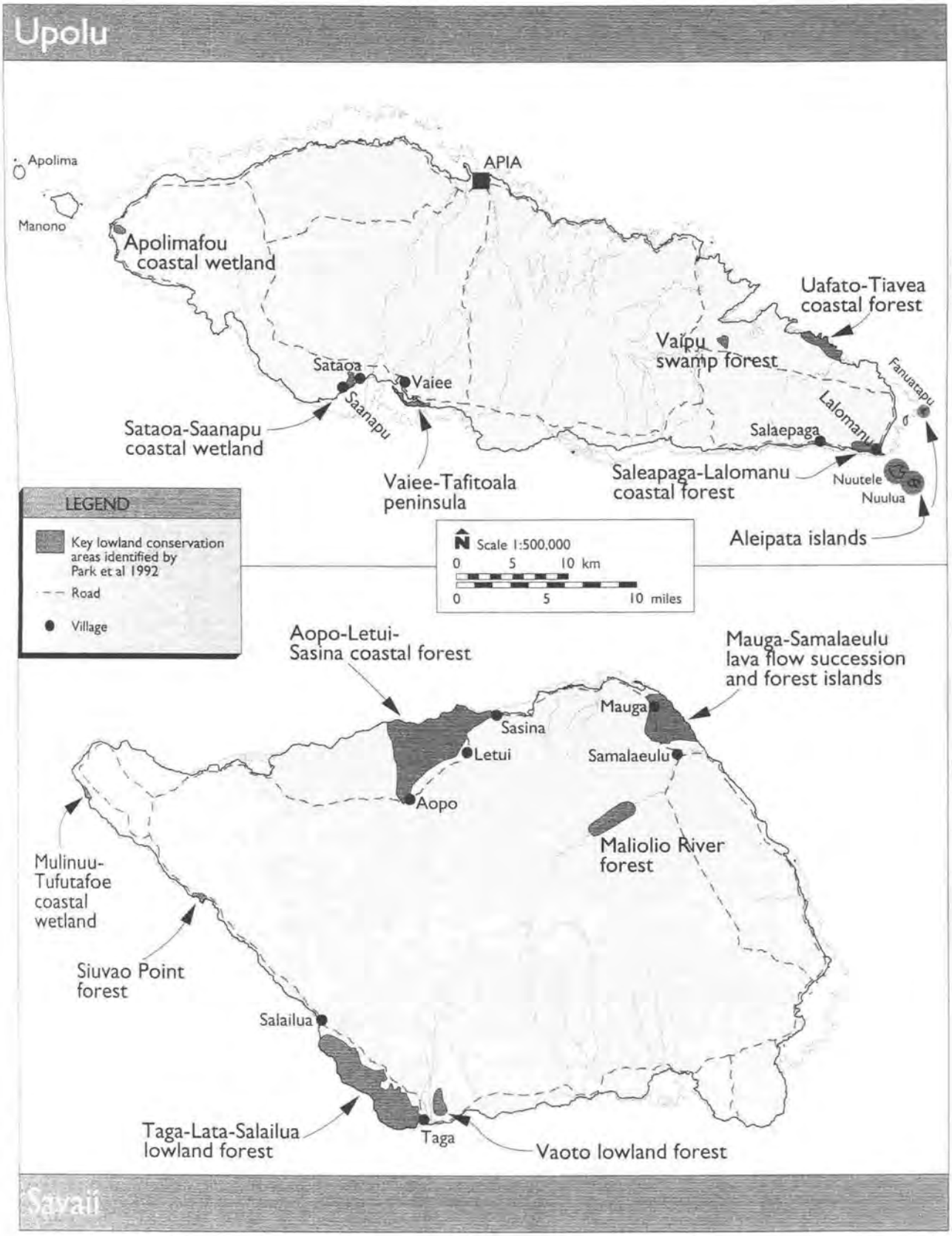
5.9 Climate change and greenhouse effect

There has also been limited local response to the issues of climate change and the greenhouse effect. The main local risks from greenhouse warming include:

(1) coastal inundation;
(2) shoreline retreat;
(3) more severe and frequent storm and wave conditions;
(4) enhanced coastal sedimentation; and
(5) threats to infrastructure and services (Bryant 1991).

Coastal communities are particularly vulnerable to the predicted impacts of sea-level rise. (photo: A.C. Robinson, reproduced courtesy of DLSE)

Figure 5.4 The fourteen key lowland conservation sites identified by Park et al.



Source: After Park et al. 1992

The 'ava' bowl, part of traditional ceremony and made from the 'ifelele' tree (now increasingly rare) is a sought-after artefact of Samoa. (photo: A.C. Robinson, reproduced courtesy of DLSE)

5.10 Samoan culture

Cultural identity gives people dignity (Brandt Commission 1980). The creative aspects of cultures are important because (1) they create a sense of identity, (2) they give pleasure and personal enrichment, and (3) they give meaning to life and the world (Tausie 1980). Preserving history maintains continuity of human identity and is essential for the evaluation of change (Young 1991). Heritage conservation contributes to the heightening of perceptions of our environment and the strengthening of our knowledge and understanding of history, and helps confirm our identity as people (Proudfoot 1991).

Since the late 1970s, Western Samoa has tried to promote the provision of national facilities for arts and culture. Two reports were prepared for the government: Specht (1978) provides the basic requirements for the development of a national cultural centre, while Neich (1987) documents a feasibility study for the development of a national museum and cultural centre. In fact, a national museum was set up in the early 1980s at Mulinuu, but failed through lack of funds and public support.

Recently, the government has supported the classification of old German records that are still in Apia. A group of local people has formed an arts society, O Mea Sina Samoa, to promote local arts and culture. In early 1992, a workshop was conducted to revive the idea of a national museum and cultural centre. At this workshop, the wide functions of these facilities including their role in tourism development were discussed (Fiame 1992), as well as the need to preserve traditional culture for the appreciation of future generations (Leleisiuao 1992).

The cultural priorities are (1) to establish a policy on Samoan culture, and (2) to establish the cultural centre and museum facilities as the focus of efforts to preserve and develop Samoan culture.

5.11 Human resources

Education plays a important role in human resource development. Government emphasis in the Seventh Development Plan (DP7) is to prepare people for the economic opportunities which are available to them, through the upgrading of education resources. The government has also approved compulsory free education for primary schools. However, as shown in Table 5.6, the education budget has been virtually fixed at about 10 per cent of the national budget since 1981, and about 95 per cent of the total goes to fund recurrent expenditure.

A human resources plan for the public sector has been prepared by the Public Service Commission (PSC), and submitted to government for approval. The specific objectives of the plan include (1) better matching of skills with positions; (2) stronger incentives to acquire and upgrade skills; (3) more professional management; and (4) improved retention of qualified staff (PSC 1992). Miles et al. (1992) predict that unless strategies are put in place to promote a cash-oriented economy, Western Samoa with reduced out-migration will

Picnic area development at Sopoaga Falls, Upolu. Tourism is increasingly important for employment and as a foreign exchange earner. (photo A.C. Robinson, reproduced courtesy of DLSE)

face the common problems related to urban drift and high unemployment.

Table 5.6 Education Department budget, 1981–1989 ($'000)

Year	Education budget	National budget	% Education/ National
1981	4,630	55,500	8.3
1982	4,760	57,900	8.2
1983	6,700	70,500	9.5
1984	7,420	103,200	7.2
1985	8,400	101,700	8.3
1986	10,510	104,600	10.0
1987	10,780	121,000	8.9
1988	11,550	125,200	9.2
1989	13,150	132,500	9.9

Source: Taulealo 1990

The options for the future include (1) a human resource development plan based on a clear policy on economic development and direction; (2) development of school and vocational programmes in response to required workforce needs; and (3) assessment of national investment in human capital (Schultz 1961).

5.12 Economic growth

The current state of the Western Samoan economy is well documented in DP7. While the economy was 23 per cent larger in 1991 compared to 1987 in terms of GDP at current prices, it actually declined in real terms (taking inflation into account) during this period. (Cyclone Ofa in 1990 reduced GDP by about 5 per cent.) This is a disappointing performance since there was an average GDP growth of about 3 per cent per annum from 1982 to 1987 (GWS 1992a).

Like many of the small South Pacific Island nations, Western Samoa has endeavoured since independence to develop a modern economy from traditional village agriculture and primary products. The country has no known minerals, and an Exclusive Economic Zone which is among the smallest in the region. The main exports are agriculture based products which are subject to numerous natural and external factors beyond the country's control. With declining export earnings and dwindling foreign reserves, the government will continue for some time to rely on foreign assistance and overseas remittances to fund its development programmes (Fairbairn 1985).

Future options to achieve sustainable economic growth include:

(1) creation of skilled and resource-based employment;
(2) development of export-oriented and import-substitution activities;
(3) identification of sources of growth;
(4) improvement of land utilisation;
(5) achievement of economic efficiency; and
(6) promotion of local economic development.

Chapter 6

Strategies: National policy objectives and activities

6.1 General

While a number of environmental issues have been identified as the critical Target Environmental Components (TECs) for NEMS, there are other important issues that have not been nominated although they have considerable adverse effect on the environment. Pollution, for example, could be regarded as a TEC, but it is covered under other TECs such as water resource protection, waste management and deforestation, where associated pollution would affect the environment.

Sectors like tourism and energy could also be considered as TECs because of their vital contribution to the national economy, and potential impact on the environment. However, the energy sector in general is not a critical environmental issue although hydroelectricity generation could affect the protection of water resources and therefore is covered under that TEC. Likewise, in the tourism sector it is the impact of visitors on traditional culture and waste management which could become critical environmental issues, and these are covered under the respective TECs.

The development of human resources is identified as an important TEC, in recognition of the critical human factor in NEMS. Often, the economic value of human capital is not taken into account when assessing the costs and benefits of development programmes. Sustainable economic growth is also identified as an important TEC, with a focus on the economic activities of various sectors affecting sustainable development. For example, renewable sources of energy and eco-tourism are activities in the energy and tourism sectors respectively, which have the potential to contribute to sustainable economic growth.

Hence, there have been no straightforward rules for identifying TECs, but those chosen were considered to be the current most critical issues affecting the local environment and national development. It is most likely that as the country develops, other TECs will become the priority national environmental issues.

This chapter recommends specific objectives and activities for each TEC, based on the provisions of DP7, the national UNCED report and the UNCED Rio Declaration. It is expected that these will form the basis for national policies. For each TEC, the objectives generally aim to achieve and/or promote:

(1) direct community benefits;
(2) environmental planning and assessment procedures;
(3) information and research facilities; and
(4) greater public awareness.

The suggested lists of activities are neither exhaustive nor arranged in any order of priority or importance. However, they would provide support and guidance during policy formulation so that the critical issues are covered, and there is some consistency in the overall nature of the national policies. The repetition of some activities highlights the close linkages between all TECs, whereby an event occurring in one TEC would also impact on other TECs.

It is likely that other objectives and activities will be considered and included in the final policies when those people directly involved in the various TECs participate in policy preparation.

The outskirts of Apia show an urgent need for environmental planning. On low-lying, reclaimed land, housing and industry compete. (photo: Jennie Cary, reproduced courtesy of DLSE)

6.2 Management of population dynamics and trends

Objective 1
To attain a sustainable national population growth rate

Activities

- Improve community access to health services and facilities.
- Strengthen existing family planning and counselling services.
- Improve the standards of general education, and encourage increased participation for women.
- Expand national economic development activities, and promote more job creation opportunities.
- Expand food production and self-sufficiency through expanded agricultural extension services.
- Upgrade the quality and quantity of potable water supplies, and improve public health conditions.
- Provide financial and other incentives for families of sustainable size.

Objective 2
To integrate population issues into effective environmental planning and assessment, in line with public interest and community aspirations

Activities

- Promote public understanding and support for the strengths of, and urgent need for, environmental planning, and adopt a framework in which it can function.
- Ensure the proper determination of development proposals to minimise adverse impacts on the environment.
- Allocate equitable distribution of social services and recreational facilities between rural and urban centres.
- Improve the design of subdivisions and human settlements, and ensure effective provision of public utilities and infrastructures.
- Improve the design requirements for buildings to reflect the local conditions.
- Establish a central planning agency charged with all aspects of environmental planning, including the social, physical, natural, economic, historic and cultural environment.

Objective 3
To expand and promote primary health care and education, through community health care programmes and school curricula

Activities

- Strengthen primary health care programmes through the Health Department.
- Promote health education through the Education Department school curricula.
- Provide adequate skilled staff and appropriate remuneration for community health workers.
- Improve public knowledge and understanding of nutrition, and encourage consumer protection.

Objective 4
To improve the collection, analysis and dissemination of demographic information and related planning data

Activities

- Strengthen existing procedures and techniques for collecting demographic and related planning data.
- Expand databases and other facilities necessary for collection and analysis of demographic and related planning information.
- Establish the extent and scope of available resources.
- Develop extension networks to improve the reporting and registration of demographic data.
- Improve the training of personnel, and methods of data collection.
- Provide easier and greater public access to available data and information.
- Encourage and support research on appropriate family planning methods, as well as family planning in the context of local tradition and culture.

Objective 5
To create public awareness of population dynamics and trends, and the consequences of rapid resource utilisation and degradation

Activities

- Communicate population and related planning issues to the public through both formal and informal means.
- Inform decision makers and the general public on the impacts of population dynamics and trends on resources and development planning.
- Utilise print and electronic media to disseminate population and related planning data.
- Promote community programmes which focus on the linkages between population and resource utilisation.
- Promote the concept of joint male and female responsibility for family planning.
- Encourage public debate and open discussion on family size and related issues.

6.3 Protection of the quality and supply of fresh water

Objective 1
To increase public access to clean water

Activities

- Approve a national master plan for the development of water resources.
- Assess the quantity and quality of water resources.
- Provide proper engineering designs for water supply networks.
- Introduce sustainable cost recovery systems related to efficiency and equity of services.
- Encourage the collection of rainwater.
- Provide incentives to conserve water.

Objective 2
To protect the quality and sources of fresh water

Activities

- Establish an independent authority responsible for water resources management.
- Develop programmes to protect water catchment areas.
- Designate public reserves/national parks in water catchment areas.
- Control the extraction of groundwater.
- Encourage community participation in programmes to protect water catchment areas.
- Utilise appropriate traditional methods to protect catchment areas and water quality.

Objective 3
To integrate the protection of water resources into environmental planning and assessment

Activities

- Undertake Environmental Impact Assessment to determine the effects of development projects on water resources.
- Establish the integrated impacts of development programmes on water and other resources.
- Establish criteria for the equitable public supply of fresh water.

Rainwater tanks offer an alternative means of water storage, Manono Island. (photo: A.C. Robinson, reproduced courtesy of DLSE)

- Develop appropriate design of water supplies for new subdivisions and human settlements.
- Encourage land use practices that will not adversely affect water resources.
- Enact legislation to control the pollution of water resources.
- Provide incentives for sustainable utilisation of water.
- Set quality standards for water utilisation, and monitor compliance.

Objective 4
To improve knowledge and develop understanding of water resource issues

Activities

- Establish databases to collect, record and analyse water resources information.
- Improve the compilation of water utilisation data (both surface and ground supplies).
- Encourage and support research projects on water resources and related topics.
- Conduct research on water quality, utilisation and conservation.
- Assess public attitudes on water supply and related services.

Objective 5
To create public awareness of issues related to the sustainable management of water resources

Activities

- Develop community education programmes on the protection of catchment areas, and the conservation of water.
- Promote public understanding of watershed management programmes.
- Promote public awareness of the need for water supply systems to operate on a cost recovery basis.
- Use existing village organisations for the promotion of water conservation and catchment area protection.
- Use print and electronic media to disseminate water resource information, and related planning information.

6.4 Protection of the sea and marine resources

Objective 1
To increase the harvestable stocks of fish and other marine resources

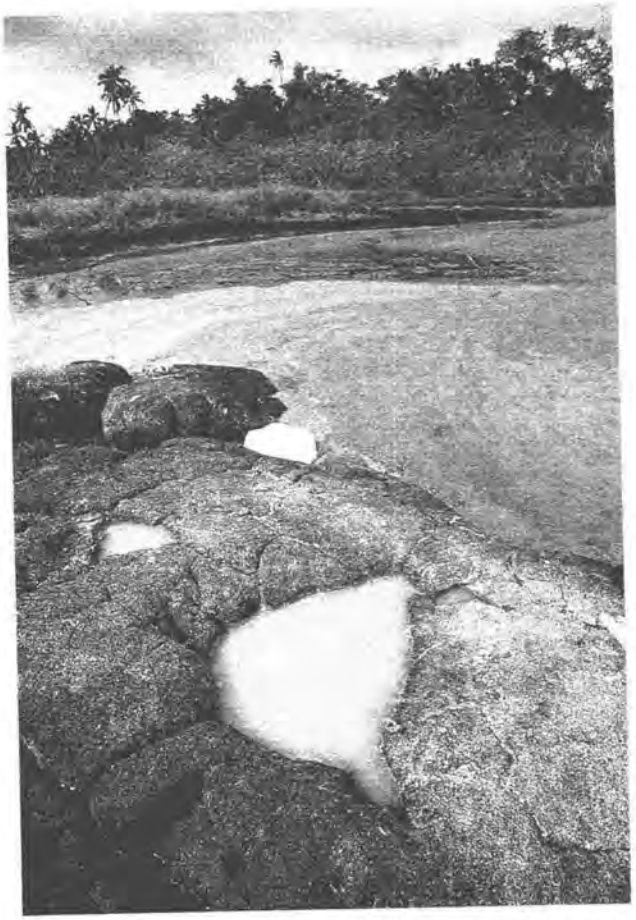
Activities

- Establish the extent and levels of fish stocks and other marine resources.
- Approve sustainable limits for fish catches and resource utilisation.
- Establish sustainable levels of species harvesting.
- Develop fish farming to supplement natural stocks.

Objective 2
To conserve and protect marine breeding and feeding areas

Activities

- Protect remaining wetlands and mangrove swamp areas.
- Prevent the pollution of lagoons and coastal areas from domestic and industrial activities.
- Develop programmes to protect reefs and coral formations from natural and human degradation.



Coastal wetlands throughout Western Samoa are threatened by human activity. Here, soap causes excessive algae growth near the washing stone. (photo: Paddy Ryan, reproduced courtesy of MFAT)

- Control the siltation of lagoons from soil erosion.
- Develop the sustainable mining of coral sand.
- Encourage appropriate traditional fishing practices that are compatible with the sustainable development of marine resources.

Objective 3
To integrate the sustainable development of marine resources into environmental planning and assessment

Activities

- Assess the impacts of development projects on marine environment and resources.
- Provide planning controls to protect mangrove and wetland areas.
- Establish pollution limits for the marine environment.
- Develop legislation to control the pollution and destruction of the marine environment.

Objective 4
To promote better understanding and improved knowledge of marine resources

Activities

- Establish facilities to collect, analyse and disseminate marine resources information.
- Conduct studies to strengthen the sustainable management of marine biodiversity.
- Encourage and support research programmes on marine resources.

Objective 5
To create public awareness of the need for sustainable development of marine resources

Activities

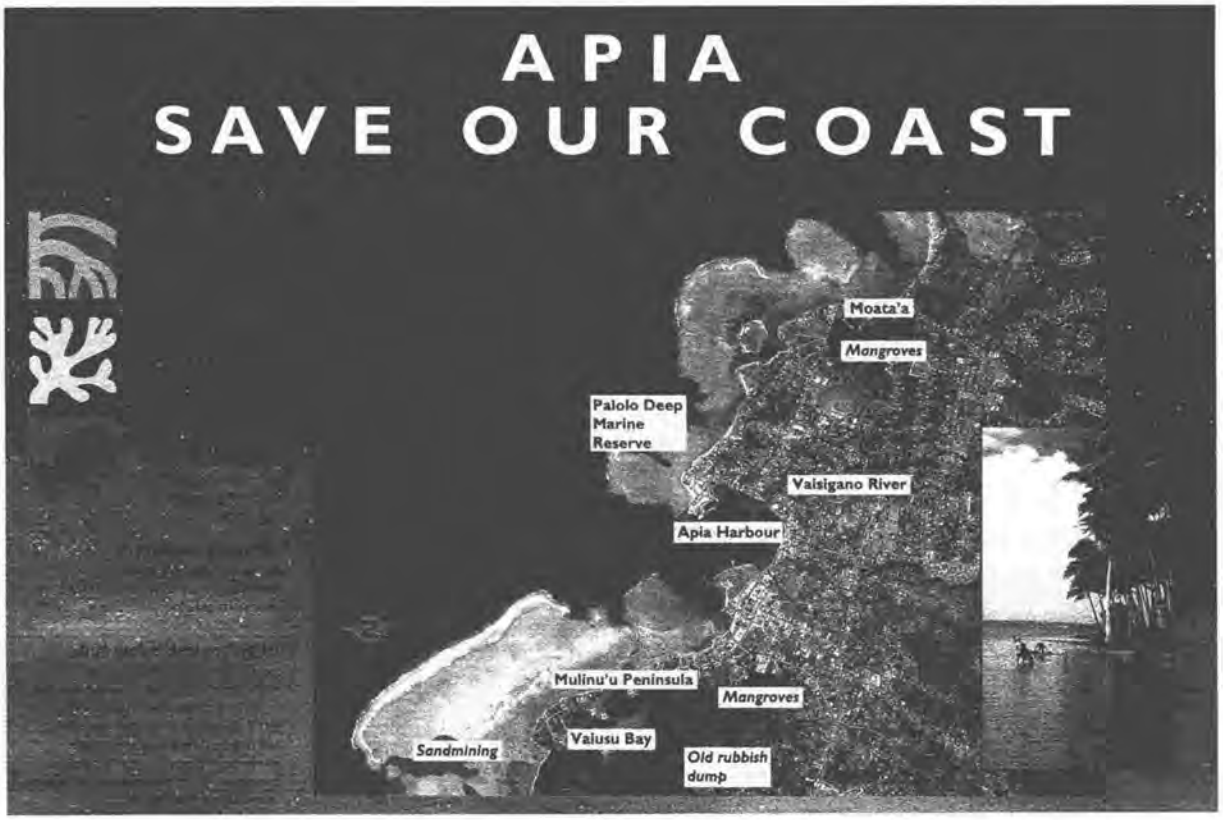
- Promote public awareness of the need to protect the marine environment.
- Educate the public about the danger to the marine environment and future harvest

Fish trap at Vaiusu Bay, Upolu. Traps with long extensions catch the full run of mullet, leaving none to breed for subsequent years. (photo: Jennie Cary, reproduced courtesy of DLSE)

Figure 6.1 ***Educational material***

The understanding of coastal processes and problems is the key to better protection. (reproduced courtesy of Division of Environment and Conservation)

Figure 6.2 Detail, educational poster



through the use of explosives and toxic chemicals as fishing techniques.

- Promote public understanding of the importance of mangrove swamps to marine life.
- Develop community programmes to reduce the pollution of coastal waters.

6.5 Management of waste

Objective 1
To prevent pollution from domestic and industrial waste

Activities

- Develop appropriate collection, treatment and sanitary landfills for sustainable disposal of solid waste.
- Provide incineration facilities for the treatment of some types of special waste.
- Develop the use of dry-based sewerage systems and alternative sewage treatment techniques.
- Prevent pollution of the sea from ocean sewage outfalls.
- Provide safe techniques for the storage, treatment and disposal of hospital waste.
- Prepare and implement a national oil spill contingency plan.
- Rationalise the classification, storage and handling of toxic chemicals.
- Establish pollution standards for domestic and industrial waste output.
- Establish incentives for non-polluting industrial processes and operations.
- Enact legislation to control pollution levels and monitor compliance with standards.
- Enact laws to prevent the importation of hazardous waste.
- Integrate pollution controls with the environmental planning and assessment of development projects.

Innovative ways of reducing waste and pollution, like this Aegis Oil (Samoa) Ltd recycling plant near Apia, need to be encouraged. (photo: Paddy Ryan, reproduced courtesy of MFAT)

Objective 2
To reduce the amount of waste for disposal and treatment

Activities

- Minimise the generation of waste at source.
- Maximise the reuse of some types of waste items.
- Promote the recycling of waste materials.
- Encourage the development of new resources from some types of waste.
- Provide incentives to industries for effective utilisation of resources and recycling of waste products.
- Develop a separation system for solid waste at source.

Objective 3
To collect, analyse and disseminate information on waste management and related activities

Activities

- Encourage and support research on waste reduction, recycling and recovery.
- Provide an integrated database for waste management and planning.
- Develop sustainable pollution levels for other resources.
- Collect information on public attitudes to waste management.
- Develop sustainable techniques for local treatment and disposal of waste.
- Analyse international developments in waste management.

Objective 4
To create public awareness of the sustainable and safe management of waste, including toxic chemicals

Activities

- Encourage community participation in waste management programmes.
- Develop programmes to inform the public of the need to reduce waste generation.
- Inform the public of the contamination risks to groundwater and coastal waters from sewage-related waste.
- Promote educational programmes to increase public understanding of health and other risks related to special waste.
- Educate the public on the correct handling and storage of toxic chemicals.
- Promote public programmes on sanitation and public health.
- Strengthen existing programmes to combat suicide using toxic chemicals.
- Promote consumer awareness of the need to minimise waste from food and store packaging.
- Provide assistance to villages to encourage appropriate waste management systems.

6.6 Combating deforestation

Objective 1
To increase community benefits derived from forest resources and related products

Activities

- Approve a master plan for the sustainable development of forest resources.
- Establish the extent and scope of existing forest resources.
- Establish sustainable limits to the harvesting of existing native forests.
- Develop sustainable and profitable levels of plantation forests.
- Develop tree plantations for local firewood.
- Maximise the economic value of forest products to end-users.

Objective 2
To regulate the clearance of trees and forest areas

Activities

- Conserve unique forests and overall forest biodiversity.
- Promote programmes to prevent soil erosion resulting from uncontrolled forest clearance.
- Promote the conservation of water catchment areas.
- Rehabilitate degraded forest areas, and expand tree cover through reforestation.
- Promote appropriate land use practices for different land areas.

Objective 3
To integrate the impacts of deforestation into environmental planning and assessment

Activities

- Assess the impacts of development programmes on forest resources.
- Establish environmental planning criteria related to public open space and green areas.
- Promote the allocation of appropriate forest areas for national parks and reserves.
- Enact legislation to allocate forest resources as national assets.
- Provide legislation to control forest clearance, and monitor soil erosion.
- Provide incentives for forest conservation on private lands.

The multiple uses of forests need to be appreciated and traditional knowledge retained. Here, an adze is used to hollow out the hull of a traditional outrigger canoe. (photo: Paddy Ryan, reproduced courtesy of MFAT)

Objective 4
To develop knowledge and understanding of forest resources

Activities

- Develop facilities to collect, analyse and disseminate information on forest resources.
- Encourage and support research on the sustainable development of forest resources.
- Undertake studies on the development of marketable forest products.
- Develop efficient utilisation of energy from firewood.
- Promote scientific research on forest species and biodiversity.
- Develop multi-use development of forest areas.
- Collate traditional knowledge of forest resources.

The head of the Forestry Division with a group of teachers at their demonstration plot in the Vaisigano water catchment area above Apia. (photo: J. Haska, reproduced courtesy of DLSE)

Objective 5
To create public awareness of the need for sustainable management of forest resources

Activities

- Promote educational programmes on the links between forests and other resources.
- Promote public understanding of the adverse effects of uncontrolled forest clearance.
- Use traditional organisations and structures to protect forest resources.

6.7 Development of appropriate land use practices

Objective 1
To increase output from land utilisation

Activities

- Establish a national land use classification system to guide the sustainable utilisation of land resources.
- Define various land use zones, and assess their sustainable capabilities.
- Strengthen agricultural extension services, especially in the rural areas.
- Provide effective support with on- and off-farm planning services to individual farmers.
- Improve infrastructure and utility services to the rural areas.
- Improve basic skills in business and financial management.
- Promote the marketing of local agricultural products.

Objective 2
To integrate appropriate land use practice with environmental planning and assessment

Activities

- Assess the impact of uncontrolled land utilisation and other development projects.
- Develop appropriate standards for the design of physical infrastructure and land subdivisions.
- Promote planning control mechanisms to guide land resources utilisation.
- Review the present land tenure system and develop policies to promote better utilisation of customary lands.
- Provide financial and other incentives for appropriate utilisation of land resources.
- Establish a framework for historic and heritage planning.
- Establish a framework for local economic planning.

Objective 3
To promote research into and knowledge of sustainable utilisation of local land

Activities

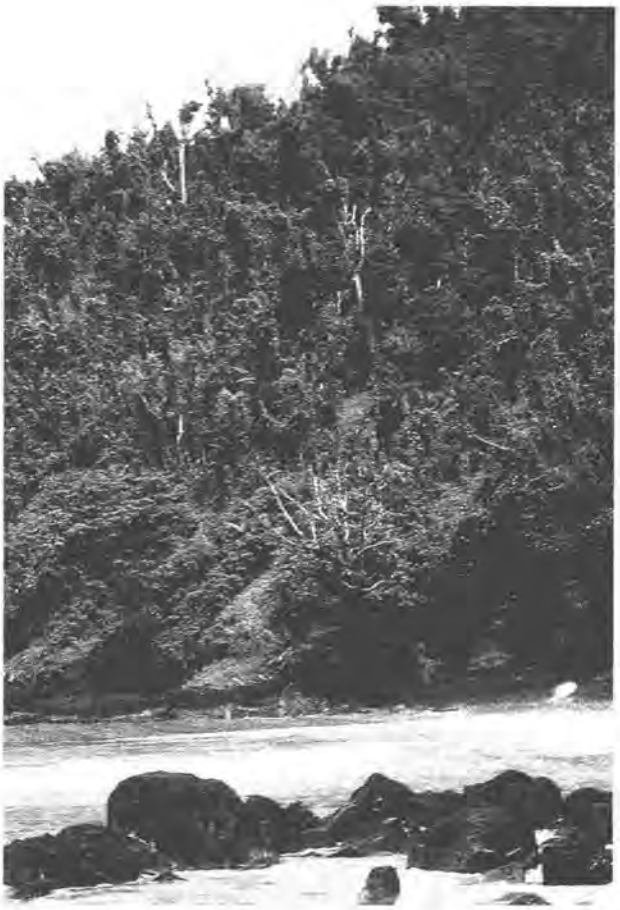
- Provide facilities to collect, analyse and disseminate information on land resources utilisation.
- Encourage and support research on local land use practices.

- Investigate the merits of some traditional agricultural and other land use practices.
- Strengthen research programmes in local soil and crop science.
- Promote research into the development of value-added products from agricultural and primary outputs.

Objective 4
To create public awareness of the need for appropriate land use practices

Activities

- Develop community programmes to promote the sustainable development of land resources.
- Promote community awareness of the linkages between land utilisation and the sustainability of other resources.
- Promote agricultural education as part of school curricula.
- Demonstrate the benefits of appropriate utilisation of land resources.
- Demonstrate the merits of appropriate agricultural methods and techniques.



The most diverse vegetation community in Western Samoa, rainforests are now rare in the lowlands. Tiavea, Upolu. (photo: A.C. Robinson, reproduced courtesy of DLSE)

6.8 Conservation of biodiversity

Objective 1
To maximise the potential benefits related to biodiversity

Activities

- Establish the extent and scope of local biodiversity resources.
- Evaluate the economic potential of known biological and genetic resources.
- Identify new and potential applications for biological resources.
- Document the current use of plant and biological resources for medicine and other applications.

Objective 2
To protect and conserve biodiversity

Activities

- Protect the natural ecosystems of forests and river environments and preserve typical examples.
- Develop programmes to minimise the destruction and pollution of natural habitat.
- Develop programmes to rehabilitate degraded habitat.

Objective 3
To integrate biodiversity conservation with environmental planning and assessment

Activities

- Assess the effects of development projects and human activities on biodiversity to promote its protection.
- Develop planning controls to protect and conserve biodiversity.
- Control and/or prevent the introduction of inappropriate foreign plants and animals.
- Strengthen the capabilities of agricultural inspection and quarantine services.

Samoans still use scourers made from natural fibres, in this instance, a native herb. (photo: Paddy Ryan, reproduced courtesy of MFAT)

Objective 4
To develop knowledge and promote understanding of local biodiversity

Activities

- Establish facilities to collect, analyse and disseminate information and data on biodiversity.
- Encourage and support research programmes on aspects of local biodiversity.
- Undertake scientific research into local biological and genetic samples.
- Collect traditional knowledge of biodiversity.

Objective 5
To create public awareness of the need to conserve biological and genetic resources

Activities

- Promote community awareness of the need to conserve and maintain biodiversity.
- Develop community programmes to share traditional knowledge of local plants and animals.
- Develop public understanding of the integrated connections between biodiversity and other biological resources.
- Promote the study of biodiversity through school science curricula.

6.9 Protection of the atmosphere

Objective 1
To support global efforts to improve atmospheric conditions and air quality

Activities

- Assess local sources of pollution and how they affect the atmosphere.
- Encourage the use of materials and products that do not deplete the atmospheric ozone layer.
- Promote the sustainable development of land transport infrastructure.
- Conserve forest resources and create tree cover.
- Encourage the use of alternative and renewable energy sources.
- Review vehicle inspection standards to reduce exhaust emission and improve engine performance.

Objective 2
To integrate the monitoring of atmospheric quality into environmental planning and assessment

Activities

- Assess the impacts on the atmosphere of development projects and some domestic activities.
- Review current policies on the importation and use of motor vehicles.
- Review the cost structures for petroleum products.
- Review present production of energy to promote sustainable cost recovery.
- Establish pollution limits for atmospheric discharge from domestic and industrial activities.
- Provide incentives for non-polluting or less polluting industrial processes and products.
- Develop appropriate designs for buildings and towns in response to predicted climatic changes.
- Develop procedures to promote the equitable allocation of fresh air and other public goods.
- Develop national policies for alternative energy sources.

Rush hour on Beach Road, Apia. The Western Samoan Government can help reduce greenhouse gases produced by vehicle emissions through reviewing inspection standards, policies on the import and use of motor vehicles, and cost structures for petroleum products. (photo: Paddy Ryan, reproduced courtesy of MFAT)

Objective 3
To develop understanding of the effects of pollution on atmospheric quality

Activities

- Establish facilities to collect, analyse and disseminate information on the causes and consequences of pollution in the atmosphere.
- Provide updated information on global developments in climatic changes and atmospheric pollution.
- Encourage and support research programmes on pollution controls.
- Undertake cost/benefit studies into alternative energy supplies and sustainable transportation.
- Establish the effects of some traditional behaviour (for example, open burning) on the atmosphere.

Objective 4
To create public awareness of global climatic changes and the need to protect the atmosphere

Activities

- Develop community programmes to combat atmospheric pollution.
- Promote public education programmes on the causes and effects of global climatic changes.
- Promote public support for clean air policies through consumer networks.
- Encourage public participation in efforts to reduce pollution of the atmosphere.
- Encourage self-sufficiency in preparation for the predicted outcomes of global climatic changes.
- Inform the public of global efforts to combat climatic change and atmospheric pollution.

6.10 Planning for climate change

Objective 1
To improve preparedness for the effects of predicted climate change

Activities

- Assess the likely risks due to climate change (for example, sea-level rise and tropical cyclones) in the design of long-term projects.
- Approve appropriate planning standards for coastal and low-lying areas.
- Develop urban design criteria to minimise the effects of potential sea-level rise and climate change.
- Develop engineering designs for buildings and physical infrastructures, especially in low-lying areas.
- Establish appropriate standards for the provision of public services in high-risk areas.
- Promote self-sufficiency in preparation for expected natural disasters.
- Assess the likely impacts of sea-level rise on groundwater and marine resources.
- Determine the social effects of sea-level rise on coastal communities which may have to relocate elsewhere.
- Adopt appropriate land use practices for low-lying areas.

Sea wall construction by Apia foreshore. When natural systems are disturbed, engineering solutions may help to protect urban areas from the impact of waves. (photo: A.C. Robinson, reproduced courtesy of DSLE)

Objective 2
To develop knowledge and promote understanding of the predicted impacts of climate change and the greenhouse effect

Activities

- Provide facilities to collect, analyse and disseminate information on climate change and greenhouse effect.
- Educate the public on the causes and effects of climate change.
- Inform the public on current global and regional knowledge on sea-level rise.
- Monitor local tidal fluctuations and coastal wave actions.
- Monitor weather patterns and regional wind movements.
- Promote public awareness of the risks to life and property associated with sea-level rise and tropical cyclones.
- Prepare guidelines on actions to adopt in response to climate change.

6.11 Preservation of traditional arts, culture and history

Objective 1
To strengthen the sense of Samoan identity through the preservation of traditional arts, culture and history

Activities

- Approve a national policy on traditional arts and culture.
- Establish a national museum for the preservation of traditional artefacts.
- Develop national archive facilities to manage historic documents and Samoan history.
- Establish a national cultural centre to promote the teaching and practice of traditional arts and crafts.
- Develop national facilities for the performance of traditional songs and dances.
- Improve the provision of national library services.
- Encourage the teaching of Samoan culture at schools and local universities.
- Encourage the participation of NGOs and village organisations in programmes to promote the preservation of Samoan culture.

Objective 2
To integrate the preservation of traditional arts, culture and history with environmental planning and assessment

Activities

- Assess through Environmental Impact Assessment (EIA) the impact of development projects on traditional organisations and values.
- Provide incentives and controls to preserve historic monuments and sites.
- Establish procedures for heritage planning.
- Encourage the use of traditional architecture in the design of public buildings and village shelters.

The new 'fale' at Samoa College, Apia, replaces the previous 'fale' destroyed by Cyclone Val. Built in traditional style, synthetic twine replaces the coconut sennet. (photo: A.C. Robinson, reproduced courtesy of DLSE)

Objective 3
To promote knowledge and understanding of traditional arts, culture and history

Activities

- Support studies on the development of local arts and crafts.
- Support research on Samoan history and early development.
- Develop skills in Samoan language and oratory.
- Develop appropriate resources for the teaching of the Samoan language in schools.
- Develop local designs in less traditional products such as textiles and other export products.
- Develop traditional skills in Samoan architecture.

Objective 4
To improve community awareness of traditional arts, culture and history

Activities

- Strengthen traditional family and village organisations.
- Promote the use of traditional foods and drinks.
- Encourage the teaching of reading and writing in the Samoan language.
- Promote the practice of traditional songs and dances.
- Promote the use of traditional buildings.
- Encourage the use of traditional fishing techniques.

6.12 Development of human resources

Objective 1
To improve the management of human resources to meet community expectations and aspirations

Activities

- Approve a national policy for the effective development and use of human resources.
- Strengthen the role of workers and their organisations in sustainable development.
- Strengthen the role of business and industries in sustainable development.
- Strengthen the role of NGOs as partners in sustainable development.
- Provide appropriate worker remuneration linked to efficiency and productivity.
- Provide adequate rewards for skills upgrading.
- Improve the returns to labour in the primary sector.
- Promote worker participation in management functions and decision making.

Objective 2
To integrate human resource planning needs with overall environmental planning and assessment

Activities

- Assess the current and future staffing needs of all sectors at the national level and in the public service.

- Integrate human resource needs with general education and skills training programmes.
- Improve accountability in development and social programmes.
- Establish a tripartite structure to manage industrial relations.
- Improve working conditions and occupational safety.
- Increase investment in skills and staff training.

Objective 3
To improve knowledge and understanding of human resource development

Activities
- Establish facilities to collect, analyse and disseminate human resources information.
- Undertake research on relevant local human resources development issues.
- Provide options to minimise the loss of local qualified workers to overseas countries.
- Develop rationalisation of the public service, with more clearly defined career paths, strengthened management and appropriate incentives.
- Assess the nature and scope of 'human capital'.

Objective 4
To make the public aware of the requirements of human resource development

Activities
- Inform the public through schools and vocational institutions of available opportunities for human resource development.
- Explain to parents the career opportunities that are available to their children in the local labour market.
- Promote the effectiveness and relevance of education at all levels, both academic and vocational.
- Introduce vocational and career planning programmes for school students.
- Promote adult education to improve skills for those already in the workforce.
- Prevent the 'brain drain' to overseas labour markets.

6.13 Promoting sustainable economic growth

Objective 1
To improve the local standard of living through sustainable economic development

Activities
- Approve a national policy aimed at sustainable economic growth.
- Create a good mix of employment opportunities.
- Develop resource-based industries using local products.
- Attract foreign investment in appropriate industries.
- Encourage local entrepreneurial activities by providing incentives for such individual and/or joint ventures.
- Consolidate the efficient use of existing infrastructure.
- Revitalise the primary sector including the traditional system of agriculture and traditional crops.
- Encourage the harvesting of new cash crops with higher cash returns, for example, vanilla, lime, chilli, ginger.
- Develop new commercial and community forest plantations.
- Develop the fisheries sector to meet domestic consumption and increased export of high-value stocks.
- Promote wide community use of renewable energy sources.
- Develop eco-tourism and other sustainable activities in the tourism sector.

Objective 2
To integrate economic development with overall environmental planning and assessment

Activities
- Establish the procedures for local economic development.
- Establish the framework for urban and regional planning.
- Create the appropriate environment for the creation of sustainable employment.
- Provide incentives for industries to practise clean industrial processes that do not harm the environment.

Eco-tourism, like this 'paupau' ride through the mangroves of Saanapu/Sataoa, offers an alternative or supplementary income to communities that conserve their natural areas. (photo: A.C. Robinson, reproduced courtesy of DLSE)

- Set control standards for pollution and other public 'nuisance'.
- Establish a framework for proper determination of development projects, including the use of EIA.
- Improve the procedures for monitoring of economic development programmes.
- Establish the procedures for evaluation and review of economic development programmes.
- Develop incentives for industries that meet sustainable development criteria to locate in Western Samoa.
- Improve the accountability of public officials and the reporting of publicly funded programmes.
- Improve the provision of public services based on social equity and appropriate cost recovery.

Objective 3
To develop knowledge and understanding of options for sustainable economic development

Activities

- Provide facilities to collect, analyse and disseminate economic data.
- Undertake an environmental audit to determine the actual basis for sustainable development.
- Develop appropriate indicators to monitor local economic performance.
- Assess the merits of setting up an agency for science and technology to coordinate the research and development of new products and services.
- Undertake research on appropriate ways to achieve sustainable growth.
- Update understanding on the status of the rural subsistence sector.
- Develop long-term markets for local products and services.

Objective 4
To increase public participation in economic planning and development

Activities

- Promote community participation in national and local economic planning.
- Encourage inputs from the business and labour sectors in the formulation of economic policies.
- Encourage the involvement of NGOs and grassroots organisations in economic planning and development.
- Develop educational programmes on economic development at schools and at the community and village levels.
- Communicate to the public the provisions of national policies and directions for economic development.

Implementation structures

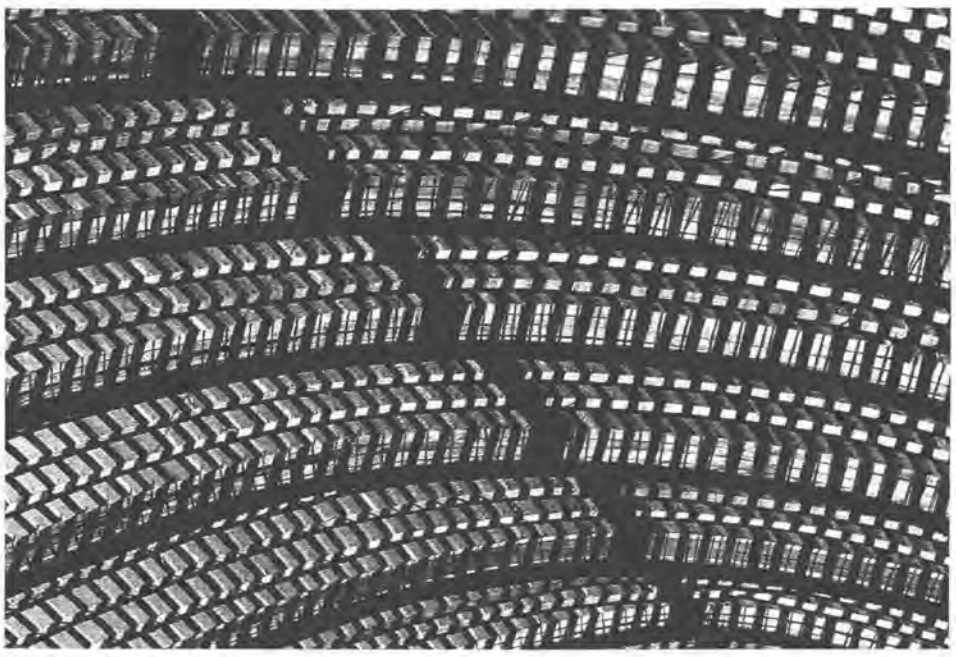
7.1 Policy formulation

With Cabinet approval of the National Environment and Development Management Strategies, the second phase dealing with policy formulation and preparation will begin. Policy Committees are to be established for the TECs, consisting of representatives from the relevant departments or agencies.

Each Policy Committee will appoint its own officers, and will establish a work plan to guide its activities. The secretarial work may be carried out by the department or agency with the most direct involvement in the TEC. Other costs may be shared by the organisations concerned as necessary. It is most important that officers involved in the Policy Committees are sufficiently senior so that decisions can be made without the need to refer back to their organisations.

Table 7.1 shows the core organisations that are expected to be involved in the Policy Committees. Other agencies or individuals may be included as necessary to provide wide representation. The activities of the Policy Committees will have been completed when Cabinet approves the final policies.

The most important aspect of policy formulation is to seek and promote wide community input and participation in the determination of proposed issues and content. It is expected that during the various stages of policy formulation an ongoing programme of public education and awareness be conducted through the press, radio, seminars or other traditional means, so that the community is kept informed of the policy proposals. Final Cabinet approval will also be speedier if widespread public consultation and support is evident.



Detail, new 'fale' at Samoa College, Apia. (photo: A.C. Robinson, reproduced courtesy of DLSE)

Table 7.1 NEMS Policy Committees

TEC	Agencies
Population	Health Department; Education Department; Department of Statistics; Department of Lands, Surveys and Environment; Treasury Department; Ministry of Women Affairs; Family Health Association; National Council of Women; Women's Development Committee
Water	Western Samoa Water Authority; Health Department; Department of Agriculture, Forests and Fisheries; Department of Lands, Surveys and Environment; Education Department; Treasury Department; Pulenuu Council; Consumer representatives; Electric Power Corporation
Marine resources	Department of Agriculture, Forests and Fisheries; Department of Lands, Surveys and Environment; Treasury Department; Pulenuu Council; O le Siosiomaga Society; Faasao Savaii Society; National University of Samoa; University of the South Pacific; Fishing industry representatives
Waste management	Department of Lands, Surveys and Environment; Health Department; Public Works Department; Department of Trade, Commerce and Industry; Treasury Department; Western Samoa Visitors Bureau; Disposal contractor representatives
Deforestation	Department of Agriculture, Forests and Fisheries; Department of Lands, Surveys and Environment; Pulenuu Council; O le Siosiomaga Society; Faasao Savaii Society; Landowner representatives
Land use	Department of Agriculture, Forests and Fisheries; Department of Lands, Surveys and Environment; Pulenuu Council; Agriculture Store; Public Works Department; Treasury Department
Biodiversity	Department of Agriculture, Forests and Fisheries; Department of Lands, Surveys and Environment; O le Siosiomaga Society; Pulenuu Council; Faasao Savaii Society; National University of Samoa; University of the South Pacific
Atmosphere	Department of Lands, Surveys and Environment; Department of Agriculture, Forests and Fisheries; Ministry of Transport; Police and Prisons Department; Treasury Department; Electric Power Corporation; Public Works Department
Climate change	Department of Agriculture, Forests and Fisheries; Department of Lands, Surveys and Environment; Public Works Department; Ministry of Foreign Affairs
Arts and culture	Department of Youth, Sports and Culture; Ministry of Foreign Affairs; Education Department; National University of Samoa; University of the South Pacific; Western Samoa Visitors Bureau; O Mea Sina (Art) Society; Western Samoa Visitors Association
Human resources	Public Service Commission; Labour Department; Education Department; Treasury Department; Public Service Association; Manufacturers Association; Chamber of Commerce
Economic	Treasury Department; Department of Trade, Commerce and Industry; Ministry of Foreign Affairs; Department of Lands, Surveys and Environment; National University of Samoa; University of the South Pacific; Central Bank of Samoa; Commercial banks

7.2 Policy presentation

While there are a number of different ways to present public policies, it is important in the case of NEMS to provide a consistent format for all policies. This will simplify the reading of documents, streamline their overall administration, and ease integration and comparison of policy issues. The format proposed for the national policies to be developed for each TEC is as follows.

(1) Introduction
(2) Policy goals
(3) Objectives and Activities
(4) Implementation
(5) Evaluation
(6) Conclusions
(7) References
(8) Attachments

(1) Introduction — The policy introduction discusses the current situation related to the TEC in question, and how it integrates with the other TECs. It describes the trends in the TEC up to the present time, and their likely implications for national development. It also identifies areas where information is lacking and remedial action required.

(2) Policy goals — The policy goals relating to each TEC are directly linked to the overall goals of NEMS, as stated in Section 3.2. The underlying principles on which the policy is based are also discussed, and the merits of particular options for future action are assessed with the preferred option (or options) identified.

(3) Objectives and Activities — In this section, policy goals are stated in terms of operational outcomes or objectives: Chapter 6 gives some of the most important policy objectives, with key activities to achieve those objectives. It is suggested that the policy objectives be arranged in a hierarchy to follow the logic of policy implementation. In this way, the public will find it easier to see how the success of one outcome will follow another, and that a lower order outcome must be achieved first before the next order outcome can be addressed (Wells 1987).

(4) Implementation — Policy implementation and evaluation are discussed in Sections 7.4 and 7.5 respectively.

(5) Evaluation

(6) Conclusions — The conclusions sum up the important policy issues, justification for the policy provisions, and the future consequences of inaction. They also show the costs and benefits to the country with and without the policy, and the winners and losers in both scenarios.

(7) References — All relevant authorities and references are listed at the end of each policy document. This provides a bibliographic record for the particular TEC, which can be updated periodically, especially during policy evaluation.

(8) Attachments — Lastly, any other information that the Policy Committee identifies as relevant to the policy is included in the attachments at the end of the policy document.

Table 7.2 NEMS Implementing Agencies

TEC	Implementing Agency
Population	Department of Lands, Surveys and Environment (Division of Environment and Conservation)
Water	Western Samoa Water Authority
Marine resources	Department of Agriculture, Forests and Fisheries (Fisheries Division)
Deforestation	Department of Agriculture, Forests and Fisheries (Forestry Division)
Waste management	Department of Lands, Surveys and Environment (Division of Environment and Conservation)
Land use	Department of Lands, Surveys and Environment
Biodiversity	Department of Lands, Surveys and Environment (Division of Environment and Conservation)
Atmosphere	Department of Agriculture, Forests and Fisheries (Observatory)
Climate change	Department of Lands, Surveys and Environment (Division of Environment and Conservation)
Arts and culture	Department of Youth, Sports and Culture
Human resources	Education Department
Economic	Treasury Department, Department of Trade, Industry and Commerce

7.3 Policy implementation

Prior Cabinet approval is required for the national policies (Phase 2) before policy implementation in Phase 3 can officially proceed. This approval is critical as it will require the various departments and agencies to cooperate in NEMS policy implementation as a priority part of their normal duties and responsibilities. The NEMS policy provisions will also be the focus in the preparation, assessment and implementation of all national development programmes.

The success of NEMS policy implementation will largely depend on the support given by the heads of the departments or agencies concerned, and their commitment of the necessary staff and resources. As NEMS is based on issues and not sectors, the willingness of the various organisations to work together is also of vital importance for successful implementation. With a number of sectors having joint responsibility for each TEC, it would be easy for some to be less committed, and simply hope that others will take charge.

To coordinate the implementation of NEMS national policies, TEC Advisory Committees are to be established. It is expected that the members of the Policy Committees will form the core of the TEC Advisory Committees which will set their own rules and procedures. The administration of NEMS policy implementation will become the responsibility of the organisation with the greatest involvement in a particular TEC. Table 7.2 shows the recommended Implementing Agencies for the various TECs. The necessary implementation tasks will become part of the normal activities of the Implementing Agencies.

The TEC Advisory Committees, in close consultation with the Implementing Agencies, will approve the Work Plans for policy implementation. These Work Plans will set out priority activities, project details, public education programmes and implementation schedules. They will also provide the mechanisms for various organisations and individuals to interact and/or contribute to policy implementation activities.

7.4 Evaluation

Evaluation is an important implementation component. Without independent evaluation of policy

activities, the extent to which objectives have been achieved cannot be properly assessed. It is expected that policies will be evaluated every three years. The evaluation objectives are to be clearly defined and will include (1) an assessment of how the objectives are met, and (2) a review of the adequacy of current policy requirements. The latter would provide recommendations to improve policy implementation and/or existing provisions, and allow the TEC Advisory Committees to propose any necessary changes to Cabinet for approval.

It is important that evaluation be carried out by independent evaluators who have not been involved in policy implementation. This would minimise preconceived perceptions of the outcomes and the likelihood of biased results. The following evaluation components are identified as most useful and should be included in the evaluation plan (Taulealo 1990):

(1) intended outcomes;
(2) activities to achieve outcomes;
(3) factors affecting the achievement of outcomes;
(4) criteria for success; and
(5) performance indicators.

The TEC Advisory Committees will approve the evaluation plan to be used, especially the performance indicators, so that the final results would be of maximum benefit to the Committee. The use of qualitative indicators is to be encouraged as these would assess community feelings about the success or otherwise of policy implementation.

7.5 Overall coordination

Under the present system, the overall coordination of NEMS activities will come under the Division of Environment and Conservation (DEC) of the Department of Lands, Surveys and Environment, with a NEMS Advisory Committee comprising the chairpersons of all the TEC Advisory Committees. The NEMS Advisory Committee will set its own rules and procedures, but the head of DEC would be in the best position to be its chairperson. The activities of the NEMS Advisory Committee will be a priority part of the normal duties of DEC, and will include regular reporting to Cabinet on the overall progress of NEMS implementation.

In the long term, there is an urgent need to establish a separate government organisation to be responsible for environment and planning matters. This will bring all issues related to environment and development under one authority which should minimise conflicts and delays. The main objective of this new organisation will be the promotion of sustainable development through the management of resources and the control of adverse impacts of development projects on the natural, social, cultural and economic environments. It will employ professional staff from a wide range of disciplines, and existing planning divisions of various departments may have to amalgamate under the proposed organisation. It can also coordinate other environmental services such as waste management, development consent and building approval.

PART 3
Programme profiles

At the time of writing (October 1993), the identification and prioritising of activities within the NEMS framework is not yet complete. This will take place during the policy formulation stage (Phase 2). It is this remaining and vital part of the process which will properly determine the NEMS programme profiles.

For the purposes of publication of this document, however, it is necessary to give an indication of the programmes viewed as being the priorities for funding assistance for Western Samoa at this stage of the NEMS process. The profiles that follow are thus not the result of NEMS Phase 2.

In addition, there are projects already being implemented which focus on some of the priority issues identified by NEMS Phase 1. In order to present a picture of the current priorities of the Government of Western Samoa, it is important to note the existence of these projects which provide the immediate context for the profiles which follow.

The principal projects already approved or under way which relate to the priority issues or Target Environmental Components (TECs) identified in NEMS Phase 1 are identified in the following list. Note that only projects which seek to achieve integrated results, or tasks identified in the NEMS Phase 1 document, but which are not purely single-sector targeted, are listed:

(1) The water catchment restoration and protection component of the Cyclone Damage and Rehabilitation Project (DAFF and DLSE).
(2) Waste Management Public Awareness Project (DLSE).
(3) Amendments to environmental legislation, including the provision of an appropriate process of Environmental Impact Assessment (DLSE).
(4) Western Samoan participation in the SPREP Regional Environmental Awareness Programme (DLSE).
(5) Apia sewerage project (principal investigations have been completed, but final decisions are yet to be taken by the Government and funding secured) (PWD).
(5) Rainwater tank project (PWD).
(6) Conservation and sustainable management of the mangroves and their environs at Saanapu and Sataoa (DLSE)
(7) Protection and sustainable use of the lowland forests of Aopo, Letui and Sasina (DLSE and Faasao Savaii)

(8) Planning for the protection and sustainable use of the lowland forests and islands of the Aleipata district (DLSE, DAFF and the O le Siosiomaga Society).
(9) Re-development of the National Botanic Garden at Vailima (DLSE).
(10) Bird surveys and management for species of conservation concern (DLSE).
(11) Establishment of a Biodiversity Database (DLSE).
(12) Conservation and Management Programme for Sea Turtles in Western Samoa (DLSE and DAFF).

Detailed programme profiles

Contents list

Target Environmental Components (TECs)	Programme profiles	
Management of population dynamics and trends	1 Population workshops	66
Protection of the sea and marine resources	2 Palolo Deep Marine Reserve — planning and management	67
Management of waste	3 National Waste Management Strategy	69
	4 Hospital wastes management project	71
	5 Introduction of biogas technology	73
Conservation of biological diversity	6 Ecological survey of mid-slope and upland forests	75
	7 Compilation and publication of a Flora of Samoa	77
Coastal Zone Management*	8 Coastal ecosystems monitoring	79
	9 Integrated coastal zone management project	81
	10 Coastal sand and aggregate resource survey	83
	11 Coral reef / mangrove ecological monitoring	85
Preservation of traditional arts, culture and history	12 Preservation of archaeological sites	87
Promoting sustainable economic growth	13 Sustainable development of handicrafts	90
Institutional strengthening	14 Institutional strengthening for the Division of Environment and Conservation (DEC)	92
Environmental education	15 Environmental awareness survey	95
	16 Video production on the environment	97

* *Includes aspects from TECs: Planning for climate change; Protection of the sea and marine resources; Conservation of biological diversity*

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

Programme Profile 1

Population workshops

Background

At current growth rates, and assuming that emigration opportunities will continue to decline, Western Samoa's 1986 population of 157,158 could double by the year 2021. The problem is not so much that population is increasing, rather that land and other natural resources as well as existing social and economic infrastructure will not be able to accommodate a higher population at the current level of living standards. The result of raising a population beyond the optimum level is the over-exploitation and degradation of the natural resource base — which is held in this NEMS document to be the case for Western Samoa. Indeed, most of the current environmental problems in Western Samoa have been attributed to overpopulation.

On the other hand, there has been little serious effort to integrate population issues into national development planning, or to try to attain a national population growth rate that available resources can sustain. Some effort has been made, principally through the work of the Health Department and the Family Health Association, and the drafting of the population policy has highlighted many pressing issues and concerns. However, a broad-based understanding of population dynamics, an essential element for any successful programme, is still lacking. Thus, there is a need for a more concerted effort to create public awareness of population dynamics and trends and, in particular, their implications for resource utilisation and the level of living standards.

Aim and scope

To support the conduct of workshops, organised by NGOs (including village groups), to create public awareness of population issues and their relation to the environment and living standards. An important sub-objective is to develop resource materials (printed and visual materials) and resource persons.

Description

The tasks which will be undertaken under the proposed programme are to:

(a) identify locally available resource materials and ways of supplementing them;
(b) develop terms of reference for subcontracting the organisation and conduct of workshops; and
(c) monitor the conduct of workshops and evaluate their effectiveness.

Cost estimates

25 workshops at $1,000 per workshop	25,000
Total cost	**$US 25,000**

Executing agency

The Family Health Association in close cooperation with the Education Department and the Health Department, other NGOs such as the National Youth Council, O le Siosiomaga Society and Faasao Savaii Society, and the Division of Environment and Conservation.

In-kind support

The executing agency and the subcontractors will provide counterparts, some materials, and administrative/logistics support.

Duration

1 year

Programme Profile 2

Palolo Deep Marine Reserve — planning and management

Background

The Palolo Deep Marine Reserve, adjacent to the town of Apia, is a popular place for both Samoans and overseas tourists. Over 3,000 visitors a year take the opportunity to snorkel over 'the deep', enjoying the variety of marine life and resting in the 'fales' on the land portion of the reserve.

Palolo Deep is a hole in the lagoon, protected behind the fringing reef and so supporting a luxuriant growth of corals and thousands of associated plants and animals. The reserve was established in 1979, one of the first marine reserves created by a South Pacific nation. Despite its long history, there had not, until recently, been a survey of the area to determine what lives there and the range of marine habitats that are conserved. Neither has there been a formal management plan to guide its development. Work is now well in hand for the development of such a plan.

In early April 1993, following a successful week of training in the use of scuba for selected Division of Environment and Conservation (DEC) staff, a consultancy was let to carry out a biological survey of the reserve, establish boundary markers, and set up and sample permanently marked biological monitoring sites.

DEC has received the consultancy report on this biological survey and the information is being incorporated into the reserve management plan. The next stage after the completion of the plan is to implement three main areas: capital works, preparation of an information display, and re-sampling of the biological monitoring sites.

Aim and scope

To carry out a biological survey of the Palolo Deep Marine Reserve leading to the development of a management plan for the reserve and, ultimately, to the implementation of the plan's recommendations.

Description

The programme will be carried out in two phases.

Phase 1

April–December 1993

(a) DEC and a consultant carry out a biological survey of the Palolo Deep Marine Reserve; and

(b) DEC prepares a management plan.

Phase 2

January 1994 —

DEC and a consultant redevelop the reserve infrastructure following the recommendations in the management plan.

Cost estimates

Scuba training, biological survey, management plan production	37,700
Equipment for reserve management	4,500
Implementation of management plan	42,000
Total cost	**$US 84,200**

Executing agency

Division of Environment and Conservation in close collaboration with the Fisheries Division of the Department of Agriculture, Forests and Fisheries and the Western Samoa Visitors Bureau.

In-kind support

The Division of Environment and Conservation will provide scientific, technical and management staff to assist the survey, development of the plan, and its implementation.

Duration

1 year
(Up to October 1993, the scuba training and the field work for the survey had been completed.)

Programme Profile 3

National Waste Management Strategy

Background

As Western Samoa's material culture changes, and as more and more use is made of non-biodegradable and often toxic materials, there is a growing need to change the public perception of waste. No longer can waste be perceived as something that is thrown away and disappears. The problem with modern (non-biodegradable) waste is that, rather than disappearing, it has a lasting effect on the environment.

Although little is known about the amount of solid waste being generated nationwide, it is estimated that approximately 17,000 cubic m or 3,000 t of waste were disposed of annually at the former disposal site at Vaiusu Bay. All rainfall runoff from the site still discharges directly into the bay, and with no control on leachate or the types of waste disposed of there, this run-off poses serious threats to the marine environment and to the health of consumers of seafood from the adjoining bay and lagoon areas. A new landfill site further inland has now replaced the Vaiusu Bay site, with a large area of land allocated for waste disposal and recycling. Optimum design and operation of the new disposal site awaits the completion of the Waste Management Strategy.

The disposal of sewage is also a growing problem. With no public sewerage system in the country, private homes are served by a variety (in type and in standards) of on-site systems. In low-lying areas of Apia, groundwater is being polluted by effluent from septic tanks and latrines. In densely populated areas elsewhere, especially where percolation rates are high, polluted groundwater is resulting in the contamination of near-shore areas. There is also growing public concern about the use and disposal of chemicals and agricultural pesticides, and their effects on water quality and the marine environment.

The nature of modern waste and the limited land space in Western Samoa means that attention must also be given to reducing the supply of certain wastes. This may be by incentives and/or regulation through quota systems, pricing policies etc., or even by prohibition. Some new or amending legislation may be needed in order to ratify certain international conventions such as the Montreal Convention concerned with limiting damaging disposal of certain substances.

The basis of any strategy is the collection of adequate data. Certain data have already been collected, and some collection is ongoing. A waste streams data collection project is now largely completed thanks to the funding of projects by SPREP, and it is envisaged that the data and experience from this project will be utilised in developing the Waste Management Strategy.

At present, the urgent priorities for waste management are being met under the Division of Environment and Conservation's Rubbish Action Plan. This Plan is designed to be as compatible as possible with the eventual Waste Management Strategy (WMS). It should provide impetus and direction for the Waste Management Strategy to build upon, particularly by way of its associated public awareness campaign and work with the private sector.

Waste management is a critical and complex issue in Western Samoa,

and it is therefore essential that all aspects of the problem and its solution are addressed in an integrated way. This requires the coordination of actions by individuals, government, the private sector and communities in a range of activities from import control and legislative amendment to waste minimisation, separation, recycling, collection and appropriate disposal on a daily basis. The proposed National Waste Management Strategy will provide the blueprint for an appropriate programme of action.

Aim and scope

To prepare and assist in initiating the implementation of a National Waste Management Strategy (NWMS).

Description

The steps which will be followed in implementing the proposed programme are to:

(a) appoint a project manager (and any assistants needed) for six months;
(b) assess data/information collected through the waste streams data collection project, the Rubbish Action Plan and any other projects of government or NGOs, and incorporate them into the NWMS;
(c) assist DEC in setting up a coordinating committee for implementation of the Waste Management Strategy;
(d) prepare and initiate implementation of a public education campaign as a parallel component of the Waste Management Strategy in close cooperation with the Environmental Training Officer;
(e) initiate the process of achieving government approval for the Waste Management Strategy and support for its implementation; and
(f) initiate the process of implementation for the NWMS.

Cost estimates

Personnel	
Project manager—6 months	35,000
Assistants	5,000
Transport and communications	5,000
Training	5,000
Miscellaneous	5,000
Total cost	**$US 55,000**

Executing agency

Division of Environment and Conservation. Important collaborating agencies include the Ministry of Women Affairs, Health Department, Education Department, Public Works Department, Ministry of Transport, Electric Power Corporation, and NGOs such as the National Youth Council, O le Siosiomaga Society and Faasao Savaii Society.

In-kind support

The Division of Environment and Conservation will provide administrative support, counterpart staff, assistance with logistics etc.

Duration

6 months

Programme Profile 4

Hospital wastes management project

Background

Inappropriate waste management at the national hospital as well as at district hospitals is a severe problem. Sharps (needles, scalpel blades etc.), contaminated dressings, operating theatre wastes, used or expired drugs, sewage and general waste are generally inadequately disposed of, and often in ways which present considerable health risk to both hospital workers and members of the general public in the vicinity.

No system of sterilisable containers for the separate collection and transportation of these solid wastes exists in any of the hospitals, neither is there an adequate level of appreciation of the hazards involved in the incorrect disposal of these wastes. Sharps etc. are frequently disposed of down drains, sinks and toilets, into the general rubbish, or even out of windows. At the national hospital the incinerator which used to burn contaminated wastes is no longer functional, and the district hospitals have no incineration capacity at all.

The national hospital's newly commissioned sewage treatment system is not functioning properly, due to a lack of appropriate maintenance, which in turn is apparently due to a lack of adequate staff training. The plant would seem to require some relatively minor but nonetheless significant modifications in order to provide for its satisfactory ongoing operation.

The problem is partly due to a lack of adequate maintenance and administrative capacity (particularly in the case of solid waste management) and partly due to a lack of adequate staff training.

Aim and scope

The project has four components.

(a) To provide an appropriate system of sterilisable containers for ward collection of separated wastes, and sealed containers for the transportation of these accumulated wastes to the final disposal site.

(b) To provide adequate disposal facilities for contaminated flammable and inflammable hospital wastes.

(c) Training for national hospital sewerage plant maintenance staff and upgrading of the plant (provision of replacement diffuser diaphragms, a sludge dry bed, a replacement disinfection system for the present non-functioning UV system).

(d) A training programme for nurses and general hospital staff in the appropriate management of wastes, based on the new container and disposal systems provided by the project. Materials associated with the training would also be provided, from teaching materials to signs and posters.

Description

The above section outlines the project's components. The waste containers aspect is straightforward, once the appropriate products and numbers have been identified. Hospital staff training is also relatively straightforward, involving insertions into regular nurse training and in-service refresher courses, as well as the provision of posters, signage etc.

The wastewater treatment plant training is different in that it has two components. The first is training in day-to-day maintenance involving practical, hands-on involvement with the plant itself, based on an

understanding of the process and operation of the plant. The second is training on longer term, infrequent maintenance such as the removal, drying and disposal of sludge. This second component also requires the provision of some basic facilities such as a sludge drying bed. Aspects of both dictate training that is spread over a reasonable period, necessitating an initial visit and a minimum of two follow-up visits by the trainer. (This is considered to be the most effective in general training terms.)

Cost estimates

Provision of collection containers	quotes awaited
Provision of incineration/burial facilities (approx.)	9,000
Wastewater plant training	8,000
Staff training	3,200
Total cost	

Executing agency

Jointly by the Department of Lands, Surveys and Environment and the Health Department.

In-kind support

The Government of Western Samoa will provide local counterparts, office space and logistics support. Some minor local budget contributions (for example, maintenance budget for wastewater plant, construction of incineration compounds using materials provided by the project) will be possible.

Duration

Training should occur over a three-month period rather than a short immersion course. Ideally, this would involve an initial training session and two or more follow-up sessions. In the case of the wastewater treatment plant, such training would focus on key activities such as sludge removal and drying, which only happen periodically.

Programme Profile 5

Introduction of biogas technology

Background

Liquid effluent containing high biological nutrient loading, uncontaminated by chemical or other wastes, is a major source of environmental degradation in Western Samoa.

Three distinct sources of such pollution exist, at three different scales. There is a village level source of liquid nutrient pollution from pigs and poorly designed and maintained toilets; an urban source in Apia from principally domestic, but also commercial, sources as well as subsistence activities such as family pig rearing; and an industrial source centred mainly on the Vaitele industrial estate.

All three sources hold good potential for the successful application of biogas technology and warrant the setting up of pilot projects and investigations. Preliminary discussions which have been held jointly between the Australian International Development Assistance Bureau (AIDAB), the Chinese Government and SPREP have proved promising.

Aim and scope

To develop an integrated biogas project involving pilot applications in both the rural and urban context, and the establishment of a training course at the Western Samoa Polytech, drawing on Chinese expertise and utilising AIDAB and SPREP funding sources. The project would also undertake investigations into the further development of biogas applications in Samoa including the Vaitele industrial estate and the government rubbish dump at Tafaigata, as well as the further expansion of the village/family level applications.

Description

The proposal would see the contracting of a small group of Chinese consultants to:

(a) oversee the construction of the small-scale pilot projects;
(b) train the people involved in running the pilot projects;
(c) establish and run a short course for the Western Samoa Polytech as well as a training course for trainers; and
(d) carry out feasibility studies on the further application of biogas technology including a system/systems for the Vaitele industrial estate, the Tafaigata rubbish dump and the Apia urban area.

Funding for the Chinese mission may be sought from SPREP. Funding for materials may be sought from AIDAB.

Cost estimates

Consultants (three, six months each)	75,000
Consultants travel and accommodation costs	30,000
Training materials and costs	10,000
Construction materials	5,000
Total cost	**$US 120,000**

Executing agency

Department of Lands, Surveys and Environment, Western Samoa Polytech.

In-kind support	The Department of Lands, Surveys and Environment will provide logistics and administrative support from its own budget. The Western Samoa Polytech will supply office space and general support to the preparation and carrying out of training programmes.
Duration	Six months

Programme Profile 6

Ecological survey of mid-slope and upland forests

Background

Many of the terrestrial surveys undertaken between 1974 and 1991 were sketchy in nature, their main aims being to identify sites for protection. The most recent and comprehensive one was done in 1991, focusing on the lowland forests and identifying fourteen key sites to represent the biological diversity of this habitat. These surveys and other works have provided an adequate information base on birds, reptiles, mammals, flowering plants and ferns, particularly in the lowlands. The key gaps in knowledge are in the uplands, the preferred habitats of many species of native plants and animals. Increasingly, the uplands have also become the last refuge of several endangered species such as the tooth-billed pigeon (*Didunculus strigirostris*). The upland forests suffered severe damage from the two recent cyclones, and there is also increasing pressure to exploit these areas for logging and agriculture. There is therefore an urgent need for a survey to identify key upland areas for protection, as the first step towards the conservation of upland forests and the sustainable utilisation of resources therein.

Aim and scope

To conduct an ecological survey of the mid-slope and upland forest areas in Western Samoa with a view to identifying key sites of sufficient size whose subsequent protection will conserve the full range of ecosystems of those habitats and ensure the long-term survival of their species and genetic biodiversity.

Description

The programme will be in two phases.

Phase 1

6 months

(a) The Division of Environment and Conservation (DEC) will plan the approximate areas to be covered in the full survey;

(b) a pilot survey will be undertaken including

  (i) an aerial reconnaissance of both islands to identify possible access points, and

  (ii) an on-foot survey of the uplands of O Le Pupu-Pue National Park on Upolu to determine ground area expected to be covered in a given time and to refine techniques for sampling different taxonomic groups; and

(c) the conducting of an awareness programme in, and negotiations with, villages to secure their support and possible participation in the full survey.

Phase 2

2 months

The consultants and DEC will conduct the full survey adopting a similar approach/methodology to the lowland forest survey of 1991. This used a number of criteria additional to standard ecological surveys including the threats to the ecosystems in question, the presence of threatened species, and the practicality of protecting the area. The precise techniques to be used will be determined in the pilot phase.

Cost estimates

Consultants	
Botanist—75 days	15,000
Entomologist—65 days	13,600
Airfares and per diem	22,000
Travel and allowances—survey team	2,500
Customary fees	2,500
Equipment—GIS global finder, traps, lens, jars, fluids etc.	3,050
Helicopter hire—13 hrs at $400 per hr	5,200
Printing	1,000
Contingencies	3,000
Total cost	**$US 67,850**

Executing agency

Division of Environment and Conservation. Collaborators include the Survey Section of the Department of Lands, Surveys and Environment, the Forestry Division of the Department of Agriculture, Forests and Fisheries, NGOs and communities.

In-kind support

The Division of Environment and Conservation will provide up to six staff members, office space, some logistics support, and some materials to assist with the survey.

Duration

9 months
(Phase I has already been funded to $US 8,840.)

Programme Profile 7

Compilation and publication of a Flora of Samoa

Background

Although there are now known to be over 800 species of flowering plants and 200 species of ferns on the islands of Western and American Samoa, and it is thought that between 30 per cent and 50 per cent are endemic to the archipelago, there is at present no published up-to-date list and no modern Flora available. Among other things, the Flora being proposed here would document the relationship of Samoan plant species with those elsewhere in the region so that investigations of possible medicinal uses can be made to focus on species, genera and families known from work done elsewhere to be pharmacologically active. The Flora would also clearly indicate the distribution and abundance of each species to enable conservation managers to conserve this valuable Samoan resource properly. Existing published works on some components of the flora contain many errors and are taxonomically outdated.

Dr Arthur Whistler has worked on the plant ecology of the Samoan Islands for 20 years and over this period has made 40 separate trips to study the flora. He is now the undisputed expert on the flora of this group. His many publications have utilised his accumulating knowledge of the flora and he would be now in a position to undertake the preparation of a high quality modern Flora.

A necessary prerequisite for the preparation of the most complete flora possible will be the completion of the proposed upland survey (see Programme Profile 6) as these habitats, particularly on Savaii, are still little known floristically. The taxonomy developed from this flora project will be progressively incorporated into the Western Samoa Biodiversity Database.

The proposed Flora will cover the islands of both Western and American Samoa because of their close biogeographic affinities.

Aim and scope

To publish a modern Flora of Samoa.

Description

The tasks which will constitute the proposed programme are to:

(a) use floristic data collected through the upland survey (see Programme Profile 6) to add to existing knowledge of the flora of Samoa;

(b) progressively prepare a text of a Flora of Samoa together with appropriate illustrative material;

(c) progressively incorporate the taxonomy established for the Flora into the Western Samoa Biodiversity Database; and

(d) use materials in database to publish a Flora of Samoa.

A grant will be given to prepare a Flora of Samoa. The grant will include three trips to Samoa to collect additional specimen material and one trip to selected European herbaria to examine material collected in the nineteenth century. Work in Samoa will be in close association with biologists in the Department of Lands, Surveys and Environment (DLSE) in Western Samoa and the Department of Marine and Wildlife Resources in American Samoa.

Cost estimates	(figures to be determined) Personnel Expert—2 years over 4-year period Database consultant—1 month Travel and per diem Clerical and technical assistant Subcontract Line drawings Material/equipment Computers compatible with DEC Biodiversity Database Printing 1000 copies of Flora
Executing agency	Division of Environment and Conservation in Western Samoa and the Department of Marine and Wildlife Resources in American Samoa.
In-kind support	The executing agencies in Western and American Samoa will provide in-country liaison and staff for all field trips. The Resource Management Officer in the Division of Environment and Conservation and his/her counterpart in American Samoa will continue to collect plant specimens and send them to the expert consultant as required. These agencies will also provide necessary photographs, office space and support in Samoa.
Duration	4 years

Programme Profile 8

Coastal ecosystems monitoring

Background

Pollution of lagoons is now considered a serious problem, and one which is evident in the poor state of the lagoons near Apia. As well, Fisheries Division statistics consistently show rapid, sometimes dramatic, declines in fish landings. The dramatic decline in the lagoon fishery over recent years has been attributed in large part to land based sources of pollution. Given the extent to which Samoans, who are primarily coastal dwellers, depend on the sea, it is of utmost importance that the lagoons are not subjected to even greater degradation than at present.

The Division of Environment and Conservation (DEC) has the legislative mandate to "prevent, control and correct pollution". In fulfilling this mandate, DEC is initiating a number of programmes including the Rubbish Action Plan, and the drafting of a National Waste Management Strategy (NWMS). Some work has been started (for example, the relocation of the Vaiusu Bay disposal site further inland, and the auditing of stream pollution and waste).

The programme proposed here will provide information on coastal/lagoon pollution which is crucial to the development of the National Waste Management Strategy; indeed, without this programme, it will not be possible to fill a major gap in the information base necessary to develop such a strategy. This programme is also intended to complement other initiatives by the Government of Western Samoa, namely the conservation and sustainable development of one of the most significant mangrove areas in Western Samoa, Saanapu-Sataoa, and the monitoring of the effects of climate change on key coastal ecosystems (Programme Profile 11).

Aim and scope

To establish and maintain a monitoring programme to collect information on and devise measures to control coastal pollution. A key sub-objective is to ensure that a local capacity is developed to undertake the necessary tasks beyond the life of the programme.

Description

The tasks which will be undertaken under the proposed programme are to:

(a) collate existing information on coastal pollution;
(b) establish a sampling programme which is broad but at the same time meets the specific requirements of the National Waste Management Strategy;
(c) ascertain in-country capacity to monitor/analyse water quality samples for specified pollutants, and define the needs to be met through the programme;
(d) plan comprehensive systems of monitoring and analysis and put them in place;
(e) carry out in-country training; and
(f) make recommendations for further actions to strengthen national capacity.

Cost estimates

Consultancy—3 months (fees, travel and per diem)	30,000
Equipment	10,000
Overseas sample analysis	5,000
Training	5,000
Communications	1,000
Contingencies	3,000
Total cost	**$US 54,000**

Executing agency

Jointly executed by the Observatory and the Fisheries Division of the Department of Agriculture, Forests and Fisheries and the Division of Environment and Conservation.

In-kind support

The executing agencies will provide counterparts, administrative and logistics support.

Duration

3 months

Programme Profile 9

Integrated coastal zone management project

Background

Integrated coastal zone management (ICZM) is concerned primarily with the resources of the coastal margins, from lowlands to lagoons. However, for key aspects such as quality of freshwater inputs, ICZM extends to the top of catchments, and for issues such as fish management, it extends past the reefs out to sea. The coastal zone is an area of great complexity and very significant ecological and economic values, and it is characterised by a susceptibility to disturbance through uncontrolled human activity. Coastal areas, both at sea and on land, thus tend to become a focus for the impacts of unsustainable human activities.

Clearly, Samoan society has traditionally relied heavily on coastal resources. Modern Samoan society also has a dependence on these resources, but due to a variety of human pressures, most are degraded to a degree that limits the returns that would otherwise be expected.

Coastal resources are influenced by activities and events which take place not only on the edge of the land and in the lagoons, but also well inland and out to sea. Management of human activities to conserve coastal resources must therefore be able to deal with a wide variety of actions and actors, from the mountain sides to the reefs.

NEMS has recognised the interconnectedness of most terrestrial activities and coastal resources, in that coastal components are included in all TECs. Integrated coastal management broadly equates to sustainable development of islands, and is essentially the approach underlying the Saanapu-Sataoa mangrove project under the South Pacific Biodiversity Conservation Programme.

The Division of Environment and Conservation (DEC) strategy for village projects is also basically one of integrated coastal management, especially in terms of the "reef to mountains" emphasis in village resource management. In Western Samoa, however, there is a difficulty in achieving an integrated approach along the coastline, in that there has been little previous experience or mechanisms developed to assist in integrating the affairs of adjacent villages.

These issues have significantly shaped the particular emphasis of this project. In the context of legislative amendments which would provide enabling provisions for such novel arrangements, the project seeks both to establish national guidelines and to implement village-based projects. This would be a model for district-wide projects involving adjacent groups of villages.

Aim and scope

The aims of the programme are to:

(a) establish ICZM principles in government planning and project development;

(b) prepare national guidelines for ICZM;

(c) identify key coastal areas where either significant environmental problems, conservation values, sustainable development opportunities, or climate change/sea-level rise vulnerability require ICZM;

(d) identify information shortfalls and needs; and

(e) prepare public information materials and programmes on the nature of and need for ICZM, as well as some practical applications and examples.

Description

The project involves the recruitment of a short-term consultant, preferably local, to manage a programme which establishes ICZM principles in government and identifies priority areas for the initiation of ICZM projects.

The first task for the local consultant is the preparation of national guidelines for ICZM. This would focus on a consultative process, working with DEC, other government agencies and village representatives through individual village visits and workshops, to establish an appropriate way of carrying out ICZM in the Western Samoan context. This task would link with the first task of the SPREP Integrated Coastal Zone Management in the Pacific Islands Region programme which seeks to characterise appropriate regional mechanisms for the introduction of ICZM. It would draw on experience gained at the Saanapu–Sataoa village project (which is itself essentially an ICZM project) as well as the Aleipata ICZM project and the SPREP/Japanese ICZM (Assessment of Coastal Vulnerability and Resilience to Sea-level Rise and Climate Change) project.

The second task would be the preparation of a report to the government recommending measures necessary to introduce ICZM principles into government planning and project development. Measures may include possible structural changes as well as policy and guideline development requirements. The report would also identify information shortfalls and needs, and priority areas for the introduction of local ICZM projects.

Cost estimates

Local consultant—6 months	10,000
Guideline development process	
Information materials	2,000
Custom fees	400
Workshops (3)	2,000
Materials	1,000
Travel	750
Total cost	**$US 16,150**

Executing agency

Division of Environment and Conservation and the Department of Lands, Surveys and Environment. Important collaborating agencies include the Fisheries Division, Agriculture Division and the Observatory of the Department of Agriculture, Forests and Fisheries; the Public Works Department; and the Ministry of Women Affairs.

In-kind support

The Department of Lands, Surveys and Environment will provide local counterparts, office space, logistics support and some financial support from its own budget. It will afford a high priority to assisting the development of the national guidelines.

Duration

Six months

Programme Profile 10

Coastal sand and aggregate resource survey

Background

Coastal erosion is a prominent general feature of Western Samoa's coastline. Coinciding with this is the widespread practice of removing beach sands and coral materials for a variety of construction purposes. The mining of beaches occurs on a large scale in the case of industrial and commercial demand adjacent to Apia, and in conjunction with the upgrading of coastal roading. It occurs on a small scale with the removal by individuals and villages by wheelbarrow and pick-up truck loads. In some cases the continuous small-scale removal of beach sand may cumulatively involve significant volumes.

The management of beach sand mining is a matter of concern for integrated coastal zone management, particularly given the desirability of maintaining maximum natural resilience of beaches and coastal sediment systems in order to provide a buffer against storm wave attack and possible sea-level rise.

Longstanding law designed to govern this activity has not been complied with or enforced. The Division of Environment and Conservation (DEC) of the Department of Lands, Surveys and Environment (DLSE) has been given a new mandate to manage coasts including sand extraction. Currently, the Public Works Department (PWD) licenses mining under an earlier mandate and generally liaises with DLSE.

The principal obstacle to proper management of both marine sand and coastal aggregate mining is the lack of resource information. Licensing of marine sand mining cannot serve any useful purpose without knowledge of volumes, sources, pathways and mechanisms within the natural sand system operating in the area concerned. Maintenance of the newly rebuilt coastal roading network and its associated shore protection works cannot occur without knowledge of and access to suitable local sources of aggregates.

Aim and scope

The project is designed to follow up on a recently completed assessment of demand for marine sands carried out by Observatory staff, and an analysis of recent coastal aerial photography by the South Pacific Applied Geoscience Commission (SOPAC). It seeks via SOPAC to enlist the services of appropriately qualified consultants to assess the characteristics and gain quantitative data on key parameters of sand budgets in lagoons adjacent to those areas of high commercial/industrial demand. This expertise should also be able to recommend optimal locations and volumes of marine sediments able to be mined on a sustainable basis from these systems.

The coastal aggregates survey is designed to provide information on the location of sources of appropriate aggregates for road and shore protection works. It seeks the services of appropriately qualified geological and engineering consultants via SOPAC.

Description

The project is in two parts, each likely to require different expertise. The first is focused on lagoon sand budget assessment. It will require a data survey phase involving aerial photography and previous field reports, a fieldwork phase, an analysis and report-writing phase, and a

report-back/seminar phase. Counterparting with local staff from DLSE, PWD and the Observatory will be sought throughout all phases.

The second part of the project is the assessment of coastal aggregate resources. This will require liaising with PWD engineers to ascertain the nature and volumes of materials sought to support the coastal roading maintenance programme and its contingencies. It will also require analysis of existing data, fieldwork, analysis and report preparation, and reporting back.

Cost estimates

Quotes are awaited from SOPAC on the resource and time requirements of such a project.

Executing agency

The executing agency for the first part will be the Department of Lands, Surveys and Environment, but with the close involvement of both the Public Works Department and the Observatory. The executing agency for the second part will be the Public Works Department.

In-kind support

The Government of Western Samoa will provide local counterparts, office space and logistics support.

Duration

Awaiting results from recent reports referred to above (Aim and scope).

Programme Profile 11

Coral reef / mangrove ecological monitoring

Background

Scientific advice on global climate change is that there are likely to be potentially severe implications for tropical coastal zones, especially coral reefs and mangroves, which are critical components of Western Samoa's coastal zone. As a small country, Western Samoa cannot do much to influence global developments, relying on collective actions through the international fora and environment treaties. On the other hand, Western Samoa can do much to prepare for possible sea-level rise by continually assessing the effects of climate change on the coastal ecosystems, and by preparing and implementing appropriate management plans.

SPREP is developing a regional programme to enhance the capacity of participating countries to monitor and plan for climate change in the Pacific, and Western Samoa's requirements could be met under such a programme. The programme proposed here could be linked to two current projects — the conservation and sustainable development of one of the most significant mangrove areas in Western Samoa, Saanapu–Sataoa, and a coastal ecosystem pollution monitoring project (see Programme Profile 8).

The latter could also be combined with the programme proposed here and implemented as a discrete programme rather than as part of a regional climate change monitoring programme. Data from the integration of these programmes (Programme Profile 8 and Programme Profile 11) would be invaluable in designing the management plans for the Saanapu-Sataoa mangroves area.

Aim and scope

To monitor the effects of climate change on critical reef and mangrove ecosystems in order to:

(a) assist in the preparation of appropriate responses;
(b) compare the effects of climate change with those of other localised pressures as well as other regional localities; and
(c) provide base information for assessing the effectiveness of mitigative programmes.

Description

This proposed programme is expected to be part of the regional programmes on:

(a) monitoring and distributing information regarding climate change/sea-level rise; and
(b) development of management plans for the critical habitats along the coast and in the lagoon/reefs.

Cost estimates

This will depend on what the regional programmes coordinated by SPREP can provide.

Executing agency

The Observatory and the Fisheries Division of the Department of Agriculture, Forests and Fisheries in close collaboration with the Division of Environment and Conservation.

In-kind support	The executing agencies will provide counterparts, administrative and logistics support.
Duration	Ongoing

Programme Profile 12

Preservation of archaeological sites

Background

Several archaeological surveys of Western Samoa have been conducted (in the 1960s and 1970s), revealing the existence of fascinating ancient field monuments and artefacts scattered throughout the islands. The preservation of these sites is important not only because they contain an important aspect of Samoan history and, therefore, Samoan identity, but also because they serve to heighten people's perception of the environment. Furthermore, if they are restored and maintained properly, they could provide pleasure and enrichment for visitors and some income for the trustees and caretakers, be they government agency, NGO, community/village or a family.

Some ancient village settlements, pathways, walls, mounds, star mounds, forts, terraces, oven pits etc., have been documented and mapped. Unfortunately, public awareness and knowledge of and accessibility to these sites is limited. As well, the maintenance and preservation of these monuments has been virtually non-existent to date.

Many of the known sites are intact and within close proximity of modern road networks and/or villages. With some effort, they could be restored, maintained and made accessible to residents and visitors interested in ancient Samoan culture.

A proposal for an archaeological and historic site survey was submitted for funding in 1992 but was deferred pending the outcome of research and field visits being conducted for the production of a new tourist map. The survey work for the tourist map has been completed and a number of significant archaeological and historical sites have been identified. This programme concentrates on the restoration and preservation of five of the outstanding archaeological sites:

(a) Pulemelei ancient mound at Letolo plantation, Palauli, Savaii — regarded as the largest ancient human made structure in the Pacific and remarkable for its imposing size (60 m by 51 m at its base and 12 m high). The mound rises in two tiers, is clear of heavy vegetation though covered in grasses and ferns, and is accessible via four-wheel drive track (1.5 km from main road) through the Letolo plantation.

(b) Star mound on Manono island — a unique 12-pointed 'star mound' (star mounds are numerous and are not only impressive in size and shape but mysterious in their origins), located on the highest point of Manono island. The Manono mound is unique because it is constructed on top of a large rectangular mound. Accessibility is via a walking track from Lepuiai village. Today, the mound is densely covered in vegetation.

(c) Mount Olo archaeological site at Mulifanua in Upolu — located on the WSTEC plantation at Mulifanua, and significant because it offers extensive traces of an inland prehistoric settlement of the period AD 500–1800, and gives an insight into living conditions and social systems of ancient Samoa. Recognisable house platforms, roadways, star mounds, mounds, oven pits etc. are numerous, easily accessible and closely grouped. The Western Samoa Tourism Development Plan 1992–2001 suggests that the WSTEC plantation could be developed as

an archaeological park with educational trails and explanatory signboards.

(d) Saleaula village–Mt Matavanu lava flow—this lava field is one of the priority areas for conservation identified by the 1991 national ecological survey. Apart from its natural beauty, there are a number of important historical sites in the vicinity (the virgin's grave and the 18th century church were left 'intact' by the otherwise all encompassing and destructive lava flows of the 1920s) which, if restored and properly maintained, would constitute interesting points for tourists and local people.

(e) Tufutafoe village–Falealupo—another of the priority conservation areas identified by the 1991 national ecological survey. This site was severely damaged by the last two cyclones and some assistance is needed to restore it to its pre-cyclone status when it was one of the more interesting points to visit. In the past the village committee which maintained the place adhered to some conservation principles, and it is intended that assistance for the restoration of the site will include training programmes in conservation.

Aim and scope

To restore and preserve selected archaeological sites as part of the Samoan heritage, and to promote them as tourist attractions while developing a strategy for ensuring the appropriate management and ongoing maintenance of the selected sites.

Description

A short-term consultant will be engaged to coordinate the restoration work that needs to be done on the sites and to advise on the management, promotion and ongoing maintenance of the sites. The consultant should be an archaeologist or a person experienced in this kind of historical preservation work. An understanding of Samoan culture and/or previous experience in natural resource management would be a decided advantage.

The consultant will be able to draw on expertise in resource management, tourism operations and Samoan history and culture available from the Western Samoa Visitors Bureau (WSVB) and the Department of Lands, Surveys and Environment. The WSVB will manage the project and supervise the work of the consultant. Tasks which will be undertaken are to:

(a) visit each site and discuss management options with the relevant people in government and villages;

(b) identify a particular person as the manager/caretaker for each site and write up their duty specifications;

(c) write a management plan for each site that assesses environmental, social and cultural impacts;

(d) implement appropriate tourist information and promotion services which should include brochures, maps, signs, posters and pamphlets outlining recommended tours and educational trails;

(e) coordinate and oversee the restoration of each site, including management of local village labour resources and equipment to be used in the clearing of sites.

Cost estimates

Consultancy—fees, travel and per diem	30,000
Transportation	
Vehicle hire—4 trips (Upolu, Savaii)	1,440
Boat hire—2 trips (Manono)	400
Petrol costs—4 trips at $50 each	200
Ferry fares—3 passengers plus car	300
Accommodation plus meals for local team	
3 people—6 trips of 3 nights each ($50 per person per night)	2,700
Customs fees	1,000
Site development	
Materials for signs—15 at $50 each	750
Manufacture/erection of signs—15 at $50 each	750
Equipment for clearance and restoration	2,500
Labour—local villages	1,500
Marketing/promotion	
Production/distribution of promotional brochures, pamphlets and posters	5,000
Total cost	**$US 46,540**

Executing agency

Western Samoa Visitors Bureau. The Division of Environment and Conservation will collaborate closely.

In-kind support

The Western Samoa Visitors Bureau will provide local counterparts with local knowledge, office space and logistics support while the Division of Environment and Conservation will provide technical assistance for conservation matters.

Duration

2 years

Programme Profile 13

Sustainable development of handicrafts

Background

A key issue in Western Samoa and the Pacific generally is the dilemma faced by government and private resource owners when confronted with the need to conserve resources. In the past, Samoans were able to live sustainably on local resources. But this was at a relatively low standard of well-being, a standard which they no longer find adequate. Samoans today desire the convenience and the higher degree of well-being offered by modern technologies, and this often requires cash. The Samoan way of life, including its duties and obligations, is increasingly monetised with the consequence that a premium is put on cash.

It is in this context that conservationists are now trying to understand and address the need for greater sustainability in the use of resources. Indeed, there is now an increasing appreciation by conservationists of the need to promote conservation and sustainable use of resources by firstly addressing the need of landowners for an acceptable means of livelihood. Thus, emphasis is being given to sustainable income-generating activities as a means of supporting conservation programmes.

The sustainable development of handicrafts is seen as one of the best ways of addressing the development needs of Samoan resource owners and of reducing the pressure/temptation to deplete the resource base (land and sea) for short-term gains. Such a programme could promote appropriate land use practices in the growing and protection of raw materials. It will also help promote pride in the Samoan culture and traditions. This is very important, especially given the poor quality of Samoan handicrafts at present.

The Faasao Savaii Society is currently involved in efforts to promote income-generating activities in Savaii and has already made informal surveys of the interest of communities around Savaii, and of potential buyers overseas. While the results have been encouraging, there is a need to carry out a more formal survey or study to confirm market interest, the type of handicrafts to be developed, and the level of sustainability in terms of both the ecological carrying capacity and the ability of producers to meet production targets.

Aim and scope

The immediate objective of this project is to determine the feasibility of developing a sustainable handicraft industry in Savaii. The long-term objective is to encourage the development of handicrafts as a viable income-generating activity and as an option for those resource owners who would otherwise be exploiting and depleting their resource base for immediate cash/development benefits. The other long-term objective is to encourage more sustainable land use practices and preserve culture and traditions.

Description

The project will require the service of a short-term consultant to carry out the feasibility study and prepare recommendations. The terms of reference will be drawn up by the Faasao Savaii Society in consultation with the Western Samoa Visitors Bureau and the Division of Environment and Conservation.

Cost estimates

Consultancy—fees, travel and per diem	30,000
Operational expenses	
Transport, report writing, customs fees etc.	5,000
Total cost	**$US 35,000**

Executing agency

The Division of Environment and Conservation will coordinate the project in collaboration with the Faasao Savaii Society and the Western Samoa Visitors Bureau.

In-kind support

The Faasao Savaii Society will provide a local counterpart to facilitate village surveys as well as some logistical support.

Duration

3 months

Programme Profile 14

Institutional strengthening for the Division of Environment and Conservation (DEC)

Background

Since the establishment of the Education and Training Unit within the Division of Environment and Conservation (DEC), it has been successful in initiating and continuing activities such as weekly radio programmes, tri-weekly newspaper columns, the production and use of educative materials, and the provision of resource persons for workshops and seminars. It has also successfully obtained grants for educational programmes and materials. The Unit, however, continues to operate with only one permanent staff member and an Australian Volunteer Abroad (AVA) expert whose contract expires in September 1994. In 1994–95 the government will increase the number of permanent positions in the Unit to two. As a result of recently received grants for environmental education projects and other campaigns, and the additional work arising from the NEMS-related publicity campaigns, the Unit needs to continue the AVA contract position to temporarily support the increased workload. To cater for NEMS-related work and other programmes, the Unit also requires an upgrading of its desktop publishing capability in addition to some assistance with design and production of materials.

Western Samoa has just begun to broadcast on its own television station and one of the priorities identified is the environment. Already, environmental programmes feature prominently on its nightly transmission, and it is expected that DEC will be one of the agencies providing the technical knowledge. As part of this capacity building programme, it is proposed that training in interview/answer and other presentation techniques appropriate for the television media be made available to the staff of DEC and other government departments.

The conservation of biodiversity is one of the priorities under NEMS, which, together with the opportunities provided under the South Pacific Biodiversity Conservation Programme (SPBCP), means a dramatic increase in the responsibilities of DEC. The biodiversity staff at DEC consists of two local staff, an expatriate chief technical adviser and an Australian Volunteer Abroad (AVA) expert, both of whom have expertise in terrestrial systems.

For the next two years there will be a focus on terrestrial biodiversity. In 1994–95 the government will increase the number of permanent positions in the unit by one. Because of the relative inexperience of local recruits, the Division will have to continue to rely on external technical assistance if it is to carry out its work effectively. Thus, there is a need to continue the AVA contract position in biological survey, which expires in September 1994.

While the current biodiversity programme will continue to concentrate on terrestrial systems for the next two years, the conservation of marine and freshwater systems is equally important. DEC is also responsible for the management of the only marine reserve in Western Samoa. There is thus a need for technical capacity in marine systems which have not been as well surveyed as the terrestrial systems. Therefore, the request also includes funds to recruit a marine biologist.

Environmental planning is another priority area under NEMS. Western Samoa's Environmental Impact Assessment (EIA) legislation is expected to be approved by mid–1994. EIA is a major requirement under NEMS, and some assistance is available under SPREP's EIA programme. However, the requirements of and demand for EIAs will be such that a much more concerted effort is required to train staff from DEC and other government departments in assessment procedures. It is expected that there will be a number of major government projects for which Environmental Impact Statements (EIS) will need to be prepared. An example is the proposed expansion of the Salelologa wharf and township. This work, and any other project which requires an EIA to be prepared in the near future, will need the service of outside experts to conduct EIAs and prepare EISs as there is no local capacity at the moment.

Aim and scope

To strengthen the capacity of the Division of Environment and Conservation in the areas of environmental awareness/education, biodiversity conservation (terrestrial and marine), and environmental planning.

Description

The programme will be divided into four tasks:

(a) to recruit long-term experts in (i) education and information (1995 and 1996), (ii) biological survey (1995 and 1996) and (iii) marine biology (1994 and 1995). The first two positions may be filled by AVA experts while the third may require an expatriate chief technical adviser (CTA). The other component of the first task will be to recruit short-term consultants in (i) visual media (1 week) and (ii) environment planning/EIA (4 weeks);

(b) the consultants to conduct training for DEC staff and other departments or NGOs;

(c) to upgrade DEC's desktop publishing capability; and

(d) to provide assistance in the production of educational pamphlets, posters, billboards etc.

Cost estimates

Technical experts	
Education and information (AVA expert—2 years)	20,000
Biological survey (AVA expert—2 years)	20,000
Marine biologist (CTA—2 years)	60,000
Consultants—25 days at $200 per day	5,000
Training	
Visual media	1,000
Environmental planning	4,000
Equipment	
Upgraded desktop publishing system	5,000
Subcontracts	
Design and production of awareness/education materials	2,000
Total cost	**$US 117,000**

Executing agency

Division of Environment and Conservation, Department of Lands, Surveys and Environment.

In-kind support	The Department of Lands, Surveys and Environment will provide local counterparts, office space, logistics support and some financial support from its own budget.
Duration	2 years

Programme Profile 15

Environmental awareness survey

Background

To devise and deliver successful educational programmes (such as the population workshops being proposed under Programme Profile 1) requires some knowledge of the level of understanding of environmental issues by target audiences, and their likely support for efforts to address them. Knowledge of the situation prior to an intervention programme also provides baseline information against which the success of such a programme could be assessed. Currently, the Division of Environment and Conservation (DEC) and other government departments (Education; Agriculture, Forests and Fisheries; Health) and NGOs are involved in environmental educational programmes with varying degrees of knowledge regarding the level of environmental awareness and appreciation among the target groups. This proposal therefore seeks assistance for the design and conduct of a pilot survey to determine the level of understanding and appreciation of environmental issues among Samoans.

Aim and scope

To design, conduct and analyse the results of a survey aimed at determining the level of environmental awareness and appreciation among Samoans. A sub-objective is to enhance the capacity of local counterparts in the design, conduct and analysis of surveys.

Description

The programme will involve the following tasks:

(a) the Division of Environment and Conservation and the Department of Statistics (DOS) will collate existing information on environmental awareness in Western Samoa and send the information to the consultant who will design the survey;
(b) the consultant will design the survey and, when in-country, will train local staff on design of questionnaires, collection of responses, and analysis of results;
(c) DOS, DEC and other collaborators will conduct a pilot phase of the survey and analyse results;
(d) DOS, DEC and other collaborators will conduct the full survey; and
(e) with the assistance of the consultant, the executing agencies will analyse the results of the survey and make recommendations for action.

Cost estimates

Consultant—14 days at $200 per day	2,800
Travel and per diem	2,400
Training	1,500
Printing of questionnaires	500
Field survey	1,000
Travel and allowance (survey team)	1,500
Contingencies	300
Total cost	**$US 10,000**

Executing agency	The programme will be jointly executed by the Department of Statistics and the Division of Environment and Conservation, with the Education Department and NGOs such as the National Youth Council as collaborating agencies.
In-kind support	The Department of Statistics and the Division of Environment and Conservation will coordinate the collection of background information, and with the other collaborators will provide local counterparts, logistics support and some materials.
Duration	3 months

Programme Profile 16

Video production on the environment

Background

Televise Samoa, the country's own television station, officially opened in May 1993, and the environment has been chosen as one of its main programming areas. Programme Profile 14 includes a request for funds to train the Division of Environment and Conservation (DEC) and other government staff in the use of the visual media. Televise Samoa has already proposed that DEC coordinate, for 1994 and 1995, the production of a series of twelve programmes (of approximately 15 minutes each) on local/national environmental issues and concerns. This programme seeks assistance for the production of a series of twelve 15-minute environmental video programmes.

Aim and scope

To enable DEC to coordinate the production of a 12-part video series on the environment in Samoa. The aims of the series are to improve public awareness of environmental issues and promote environmentally sound activities. A sub-objective is to provide DEC and other government staff with some training in video production.

Description

DEC will contract out the production of a pilot series. The results of the pilot phase will be reviewed before the contract for the overall series is issued. The contract for production of the overall series will include training for DEC and other government staff.

Cost estimates

Subcontracts	
Pilot production	10,000
Production of 12 15-minute video programmes ($5000 each)	60,000
Local consultants/guides	2,000
Training	1,000
Internal travel and accommodation	10,000
Total cost	**$US 83,000**

Executing agency

Division of Environment and Conservation. Collaborators will include Televise Samoa and other government departments, and NGOs such as O le Siosiomaga Society and Faasao Savaii Society.

In-kind support

The Division of Environment and Conservation will provide local counterparts, logistics support and subject knowledge and expertise. The NGOs will facilitate filming in rural areas.

Duration

6 months

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