

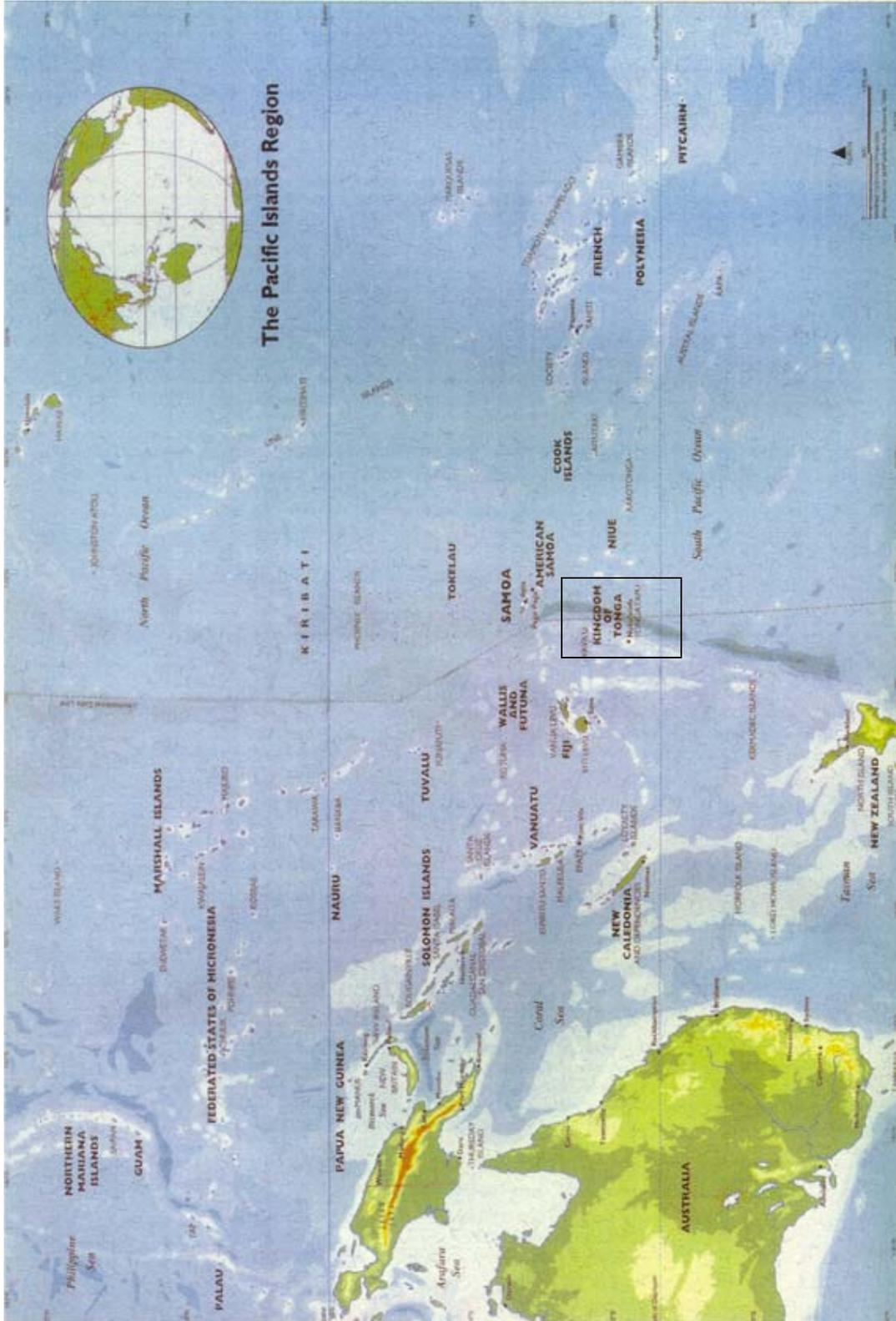
**WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (RIO+10)
JOHANNESBURG, 2002**

**TONGA
NATIONAL ASSESSMENT
REPORT**

*Synopsis of Issues, Activities, Needs and Constraints:
Sustainable Development 1992 - 2002*

Department of Environment 2002

Map of the Pacific Islands Region



Foreword

The Tonga Assessment Report for the World Summit on Sustainable Development (Rio+10), to be held in Johannesburg, 2002 was drawn from the collective experience of the government and representatives of civil society organisations in Tonga.

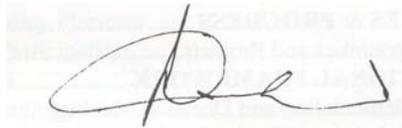
It is a snapshot of national efforts, progress, achievements and constraints encountered in pursuing the sustainable development goal; consistent with Agenda 21 and the Barbados Programme of Action but not necessarily limited to these blueprints. It is strongly driven by national priorities and related actions. The report does not only look back and assess activities since the 1992 UNCED held in Rio de Janeiro, but uses past experiences as building blocks for the WAY FORWARD for the next decade.

Global issues and scenarios expounded global actions which greatly affected sustainable development efforts of small island countries like Tonga. It is imperative that appropriate and timely international interventions are forthcoming to compliment and strengthen national needs and initiatives towards achieving the goals of sustainable development for the people of Tonga.

The Tonga National Assessment Report is in addition to Regional Assessment carried out by the CROP organisations (PIFS, FFA, SPC, SOPAC, SPREP) and other related activities carried out by UN systems in the region such as FAO and UNDP.

I would like to acknowledge the financial support given by UNDP and the Earth Council for preparation of this National Report.

Let us hope that the enthusiasm for sustainable management of Tonga's resources that this report has highlighted will prove similarly sustainable in the Earth Summit and in the crucial forthcoming stages of national follow up and implementation.

A handwritten signature in black ink, appearing to read 'James Cecil Cocker', is centered on the page. The signature is fluid and cursive, with a large initial 'J' and 'C'.

James Cecil Cocker
Honourable Minister of Environment
Government of Tonga.

January 2002

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Acronyms

ADB	Asian Development Bank
AusAID	Australian Agency for International Development
CBD	Convention on Biological Diversity
CPD	Central Planning Department
CROP	Council of Regional Organisations in the Pacific
CSO	Civil Society Organisations
DoE	Department of Environment
EEZ	Exclusive Economic Zone
EIA	Environmental/ecological impact assessment
FAO	Food and Agricultural Organisation
FFA	Forum Fisheries Agency
GCC	Government Computer Committee
GEF	Global Environment Facility
GoT	Government of Tonga
GMO	Genetically Modified Organisms
HRD	Human Resource Development
ICPD	International Convention on Population and Development
MAF	Ministry of Agriculture and Forestry
MCA	Ministry of Civil Aviation
MoFA	Ministry of Foreign Affairs
MLCI	Ministry of Labour Commerce and Industry
MLSNR	Ministry of Lands, Survey and Natural Resources
MoE	Ministry of Education
MoF	Ministry of Fisheries
MoH	Ministry of Health
MoW	Ministry of Works
MoFin	Ministry of Finance
MLSNR	Ministry of Lands, Survey & Natural Resources
MMP	Ministry of Marine & Ports
MoP	Ministry of Police
NBSAP	National Biodiversity Strategies and Action Plan
NZODA	New Zealand Official Development Assistance
PIFS	Pacific Islands Forum Secretariat
PMO	Prime Minister's Office
SPC	Secretariat for the Pacific Community
SOPAC	South Pacific Applied Geosciences Commission
SPREP	South Pacific Regional Environment Programme
TANGO	Tonga Association Non-Government Organisation
TCC	Tonga Communications Corporation
TEMPP	Tonga Environment Management Planning Project
TEPB	Tonga Electric Power Board
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific & Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
WID	Women In Development



THE WAY FORWARD AND RECOMMENDATIONS

Introduction

The 1992 Rio Earth Summit endorsed a blueprint for the future (Agenda 21), two Conventions, one on Climate Change and one on Biological Diversity, and the RIO Declaration. Since then, global, regional and national programmes were initiated to implement the outcome of the Rio Earth Summit.

Ten years after the Rio, the World Summit on Sustainable Development (WSSD, or Rio + 10) in 2002, aimed at renewing commitments for sustainable development from both governments and civil society. This global event will review achievements since the 1992 Earth Summit and look forward to the next decade in terms of needs and initiatives to be undertaken, including both institutional and financial requirements, and other sources of support to implement Agenda 21 for sustainable development, at all levels.

The Tonga Assessment Report for the 2002 WSSD is an attempt to place Tonga's future needs and initiatives within the context of a strategic set of "regional and global" initiatives that could be advocated by Tonga together with the Pacific Region.

A crucial activity in the preparing for the WSSD is the development of a country-specific National Assessment Report. This report was drawn from the collective experience of the government and representatives of civil society organisations in Tonga containing specific sustainable development achievements and constraints over the past decade as well as a 'way forward' for a more sustainable future.

Report Arrangement

The Way Forward:

This section highlights needs and initiatives required for ensuring development. It draws from specific needs and constraints identified in the national multi-stakeholder consultations and from existing National Plans and other information.

Review:

This section focuses on major activities, progress needs and constraints encountered in the national implementation of the Agenda 21, with particular emphasis on the Barbados Programme of Action.

The structure of the review is consistent with the required format from the UNEP and CROP Rio +10 Working Group, and was endorsed by the Pacific Regional Multi Stakeholder Consultation for the 2002 WSSD. The consistency in reporting format will allow for comparison and synthesis at a regional and international level.

THE WAY FORWARD

The Kingdom of Tonga Strategic Development Plan 7 (SDP 7, 2001) set a long-term vision for the Kingdom to be achieved in the first 25 years of this Century. The 'overall development' vision for the people of Tonga is in line with and compliments the goals of the Agenda 21 and the Barbados Programme of Action. Sustainable development broadly aims at achieving development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It means, socio-economic and politically sound management of available natural, human and technical resources, so that the quality of human life can be improved both now for the current generation, and for future generations.

In Tonga, achievements and improvements have occurred, as documented by the review section of this report. In essence, it has become the basis for the transformation of economic development, improvement of environmental conditions and, correspondingly provide basis for sustainable development of the local communities.



However, it should be noted that the transition to sustainable development in Tonga has been slow due to limited financial and human resources. The national economy still relies heavily on natural resources that are not only limited, but vulnerable to natural disasters and the global economy. There are other institutional, regulatory or technological constraints as well.

The following future needs and initiatives provide substantial input from Tonga to the preparatory process for the Summit. Significantly, it brought to the international attention national needs for further sustainable development for the people of Tonga.

Making time-bound efforts at the national level to achieve sustainable development for small island countries is equally important to be matched with time-bound interventions and assistance from the international community. Sustainable development measures undertaken by small island countries are vulnerable to global environmental issues and economic trends.

FUTURE NEEDS AND INITIATIVES:

1 Socio-Economic Framework for Sustainable Development

1.1 Macro-economic stability

Policies that affect international trade and the flow of international finances have a major impact on sustainable development. Promotion of smaller scale, community-based enterprises is required to ensure higher percentage of profits to remain onshore, thus minimising large capital investment and exploitation of natural resources. It is therefore important to:

Short-term

- Improve factor productivity through improvement in economic and policy environment, together with appropriate training and employment of appropriate technology;
- Encourage and develop macroeconomic policies conducive to environment and development;
- Improve access to credit along with appropriate education and training;
- Strengthen national statistical collection and active dissemination of reliable information from various sectors;
- Improve factor productivity through training and employment of appropriate technology;
- Encourage saving and mobilise financial resources to meet development needs; and
- Remove taxes and/or subsidies that do not conform to sustainable development objectives.

Long-term

- Strengthen national institutions for integrating environmental, economic and trade policies for sustainable development;
- Clearly separate responsibilities and clearly define accountabilities in the private sector, governmental authorities, government-owned enterprises, and civil society;
- Minimise national debt to avoid over burdening of future generations;
- Liberalise trade to avoid trade distortions;
- Seek differential treatment in international trade of both goods and services in order to make up for the disadvantages due to island isolation and diseconomies of scale;
- Extend free trade negotiations to ensure that labour mobility across border is allowed more freely;
- Revitalise import substitution;
- Encourage sustainable consumption patterns; and
- Introduce innovative mechanisms to facilitate improvement in skills.



1.2 Health

Sound development is not possible without a healthy population so national efforts with assistance from relevant regional, global and multilateral programmes are required to:

Short-term

- Improve and strengthen the health promotion and health protection services;
- Improve basic health infrastructures, such as safe water and food supplies, sanitation services, proper nutrition, health education, immunisation and essential drugs;
- Strengthen reproductive health programmes and services to enable women and men to fulfill their aspirations in terms of family size;
- Provide access to healthcare for all, to reduce morbidity, premature death and improve quality of life;
- Improve the availability of quality primary health care in Tonga, particularly in rural areas and in the outer islands; and
- Strengthen collaboration between MoH, other Government agencies and Civil Societies, which are involved in health related areas, in appropriate skills.

Long-term

- Provide access to quality health care for all; and
- Transfer health-care technology, with appropriate training for personnel and capacity building.

1.3 Capacity Building and Education

Institutional capacity building and education cannot be undermined as the crucial factor for sustainable development in Tonga. Improvement of technical skills relevant to situations in Tonga is important to diversify opportunities for economic growth and relieve pressures on natural resources.

Short-term

- Coordinate closely the activities of government agencies to ensure effective integration of social, economic and environmental policy; and
- Strengthen national policy-making and regulatory bodies with trained manpower and monitoring equipment with assistance from regional and multilateral bodies in terms of technical and advisory inputs.

The following technical training would properly displace skills to other potential areas that include the following:

- Maritime vessels technological skills;
- Sustainable fisheries and aquaculture entrepreneurs;
- Renewable energy technologies;
- Organic and alternative farming systems;
- Eco-tourism management;
- Strengthen capacity of private and churches school systems; and
- Seek deferential treatment to be more in line with Tonga's needs in respect of gender and merit criteria for donor funded training opportunities.

Long-term

- Develop a framework for action that allows for full community involvement in decision-making and strengthening capacity of civil society to use this framework;
- Initiate public awareness campaigns and involve civil society participation;
- Develop highly competitive and regionally/internationally recognised school systems in Tonga;
- Encourage high self motivation and fulfillment;
- Strengthen rights to access to information and personal empower; and
- Improve the status and income of women, their access to schooling and professional training and fulfillment of their personal aspirations; and empowerment of individuals and communities.



1.4 Human settlements

To improve the social, economic and environmental quality of human settlements, the living and working environment of all people, in particular those in need. It is important to:

Short-term

- Provide environmentally sound infrastructural facilities, particularly availability of water supplies, air quality, drainage, and sanitation services and disposal of hazardous and solid wastes; and
- Consider settlements located in low-lying coastal areas.

Long-term

- Improve the assessment of environmental vulnerability and risks;
- Improve management of urban settlements;
- Promote the introduction of environmentally sound technologies in the industry; and
- Strengthen town and land-use planning and management.

1.5 Sustainable Energy Development

The future of sustainable energy resources will rely on the reduction of Tonga's dependency and expenditure on imported fuels. Achieving sustainable resources will also depend on a coordinated and consistent approach towards common national developmental goals that promote widespread accessibility of energy resources. These goals should:

Short-term

- Strengthen existing Energy institutions by developing capacity to upgrade both energy planning and efficiency tools and strategies;
- Amend existing legislation and policies to take into account rapid sectoral development;
- Assist with investment in appropriate renewable energy technology;
- Promote the use of alternative renewable energy that reduce costs;
- Assist with establishing linkages with relevant regional and international energy funded programmes; and
- Utilise resource baseline studies which must take priority in the national agenda.

Long-term

- Invest capital in appropriate technology that harness indigenous energy resources (solar, wind, wave, biomass etc);
- Increase efforts to develop and apply energy efficiency measures in all energy consumer sectors;
- Increase the exploitation and utilisation of renewable energies; and
- Remove market barriers to allow for wider adoption of energy efficient technologies that may be achieved through the creation of an enabling environment in which financial incentives are provided.

1.6 Efficient Transport and Communication

Adequate means of transport and communication are necessary for sustainable development. Air and sea transport is important in providing the necessary links from the main island to the outer islands and vice versa as well as links to the outside world. Congested traffic in Nuku'alofa needs careful planning. Aims should include the following:

Short-term

- Recycle old and discarded vehicles or trade;
- Invest in cost effective technology for waste oil recycling;
- Set appropriate user charges for marine vessels;
- Establish appropriate controls and related enforcement on imported recondition vehicles; and
- Design effective traffic systems to improve traffic flows with existing resources.

Long-term

- Establish a public transportation network to improve road transportation efficiency;
- Upgrade and extend infrastructural services such as transport and communication networks to the outer islands to facilitate sustainable development;

- 
- Strengthen the national capacity for search and rescue;
 - Strengthen the capacity of existing national institutions; and
 - Improve surveillance capacity for air space and EEZ;

1.7 Tourism

Tourism continues to play a significant role in the economy of Tonga. The Tourism sector has tremendous potential for conservation and sustainable use of the natural and cultural environment, as those are Tonga's main attractions. There is a need for:

Short-term

- Preservation of oral history and historical artifacts of Tonga;
- Strengthening the capacity of communities through existing and non-existing community institutions to preserve historical/cultural sites;
- Promoting community participation in Tourism activities; and
- Better coordination of the tourism industry, Tonga Visitors Bureau and other appropriate government agencies.

Long-term

- Improvement in tourism supporting infrastructure and facilities in Tonga;
- Improvement in marketing strategies;
- Coordination of aid donors activities in eco-tourism in Pacific; and
- Effective linkages to activities of other Pacific Island countries as well as regional bodies.

2 The Natural Resources:

2.1 Land Resources Development

Land resources are crucial for survival, and currently provide the basis for subsistence production in Tonga. Yet land resources, as in other small island countries, are very limited and vulnerable to both internal and external pressures. International and regional support are required for the following initiatives to:

Short-term

- Support ongoing environmental education and awareness programmes regarding the need for effective land resource management;
- Amend all legislations for the management of land resources to be reviewed thus eliminating over-lapping, fragmented responsibilities and to bring up to date with current issues;
- Update policies and legislations and enact long standing Bills i.e. the new Pesticide Bill and the EIA Bill;
- Adapt the institutional attitude (power struggle) to allow for effective coordination and holistic approach to sustainable management of land resources and to effectively share expertise and limited government resources; and
- Instill the EIA as an integral initial process for developments.

Long-term

- Allocate resources for research and technology required to preserve the genetic resources and diversity of agricultural/food crops;
- Decentralised decision making and participatory capacity of civil society and communities who use and own the land resources;
- Develop mechanisms to strengthen the ability of traditional agricultural systems and skills to be widely integrated with 'modern' systems; and
- Provide support for Civil Societies capacity and networking to enhance sustainable resource/biodiversity management



2.2 Sustainable development of living and non-living coastal and marine resources

Small Island ecosystems have strong maritime factor. In fact the whole of Tonga may be regarded as “coastal” due to marine influences on the whole archipelago. The importance of coastal and marine resources in terms of fishery resources, biodiversity conservation, improved economic growth, tourism and food security is well recognised in Tonga. The goals are to:

Short-term

- Strengthen and improve the MoF and other relevant Ministries capacity for information collection and dissemination of data and information in an easy to understand format to the communities that improves community awareness and practices;
- Assess impacts of land based activities on the coast
- Strengthen associated legal instruments;
- Strengthen enforcement capabilities of the MoF;
- Strengthen capacity in search and rescue;
- Create other alternative programmes for resource users to relieve stress off the inshore fishery and enhance re-stocking of resources.

Long-term

- Improve/expand data collection for both inshore and offshore fisheries and other coastal and marine resources to determine sustainable harvesting levels;
- Review open access nature of the marine tenure in Tonga;
- Provide financial assistance for resource assessment of both land and marine based activities/development;
- Create alternatives for resource users to relieve the inshore fishery;
- Formulate integrated coastal zone management plans that give importance to effective resource management and that contain environmental pollution; and
- Promote ratification and national compliance with regional and international conventions for the protection of coastal and marine environments (i.e. Waigani Convention, MARPOL).

2.3 Improve the resilience of Biodiversity

Any action in protecting biodiversity should be aimed at conserving the ecosystems such as coastal and marine environments, forests, and critical habitats for both threatened and endangered species. These needs apply both to terrestrial and marine biodiversity. Objectives include needs to:

Short-term

- Identify critical species and habitat to be protected;
- Seek resources for the implementation of the Fanga’uta Lagoon System Management Plan;
- Deliver technical assistance in the areas of legal drafting to draft/review relevant national legislations, especially in biosafety and bioprospecting; and
- Obtain resources required for implementation of national development priorities.

Long-term

- Establish gene banks, for both *in situ* and *ex situ* collections;
- Need to preserve traditional knowledge and skills (intellectual property rights); and
- Development of a National Information Network for efficient acquisition, sharing and management of information.

2.4 Sustainable freshwater use and security for Tonga

Freshwater is necessary for the well being of the people in Tonga. The quality of water is degrading due to domestic sewage effluents, industrial effluents, non-point sources of pollution through agricultural run-off and salinisation. Assistance is needed in the following areas to:

Short-term

- Enhance the national capacity in strategic planning and management for more effective and enhanced implementation of integrated water resources management;
- Promote public awareness and education programmes in water conservation practices;

- Develop capacity for sewage treatment in an economically efficient and environmentally sound manner; and
- Improve rainwater harvesting techniques.

Long-term

- Transfer affordable technology, research, training in desalination options;
- Create effective and continuous monitoring programmes of underground water sources for agro-chemicals including volatile organic compounds and Organo Chlorine and Organo Phosphorus pesticides; and
- Develop appropriate economic instrument for water pollution control.

3 Natural and Environmental Disasters

3.1 Improve Natural Disasters Preparedness

Preparedness to protect peoples lives, properties and resources are high priorities in Tonga thus requiring appropriate skills, knowledge and resources. An enlightened community in disaster preparedness would minimise casualties and property/resource loss. There is a need to:

Short-term

- Develop and enforce cyclone, earthquake and fire resistant Building Code Regulations;
- Legalise Environmental Impact Assessment (EIA) of infrastructure and site;
- Strengthen the capacity of the National Disaster Preparedness Committee especially to reach the outer islands;
- Develop appropriate and effective measures to address Tonga’s vulnerability (as in Climate Change); and
- Enhance meteorological capabilities with more efficient technology for weather forecasting and dissemination of weather information and warnings timely.

Long-term

- Continue strengthening of civil society and communities capacity in emergency and in disaster preparedness.

3.2 Prevention and minimisation of man induced disasters

Other needs are to:

Short-term

- Develop appropriate technology, training and capacity building to develop emergency plans to respond to any chemicals, fires or oil spills and other hazards;
- Enact the appropriate legislation and use of the economic instrument of the “polluter pays principle”; and
- Seek resources required for enforcement of existing regulations.

Long-term

- Promote voluntary development of appropriate Code of Practice, Environment Reporting to give decision makers and the public access to information about the environmental impact of different industries, chemicals and operations; and
- Initiate and strengthen public awareness campaigns on chemical’s impacts on vegetables.

3.2.1 Address Climate Change and Sea level Rise vulnerability

Tonga is currently experiencing extensive coastal inundation and erosion that immediately require international assistance specifically to:

Short-term

- Develop and establish adaptations strategies to climate change, climate variability, sea level rise, and other climate change impacts;
- Mobilise resources for adaptation;
- Strengthen Tonga’s Meteorological Services through capacity building and appropriate technology transfer;

- 
- Link to regional and international climate change programmes to tap into resources available;
 - Strengthen the capacity to participate effectively in ongoing international deliberation for strategies to reduce GHG emission; and
 - Promote public awareness.

Long-term

- Ensure that sea-level rise issues are addressed in integrated coastal area management; and
- Promote the integration of climate change issues in the national development planning process and into relevant sectors, including energy, agriculture, industry, urban development and transport.

4 Waste Management

Waste Management has become an enormous problem in Tonga. Strengthening the capacity of government and civil society to reduce, reuse and recycle waste is a priority. Goals are to:

Short-term

- Further enhance current national programmes;
- Expedite projects for proper waste management services
- Deliver effective public awareness programmes to improve people's attitudes and practices;
- Provide economical recycling opportunities in the region;
- Mobilise resources for enforcement of existing legislation;
- Strengthen capacity of civil societies currently assisting communities in activities in waste management;
- Establish effective inter-organisational networking;
- Assist with establishing linkages with relevant regional and international waste management funded programmes; and
- Transfer efficient and clean technologies to incinerate national hazardous waste.

Long-term

- Further develop and implement legislations and policies on a national, regional and international level that promotes sustainable management of natural assets/wealth, including enforcement, data collection and on-going assessment, evaluation and economic valuation; and
- Introduce price-based instruments such as environmental taxes and charges, and deposit refund schemes as much as possible to recycle or "export" bottles and old cars.

Chapter 1: Socio-economic Dimensions

Sustainable development involves the interaction between policies for socio-economic management and those for protection of the environment and management of natural resources. Tonga has achieved much in terms of social progress. The Government of Tonga recognises the importance of sustainable development in the formulation of development plans, government budgets, regulations and policies, and the establishment of the new Department of Environment is a witness on the right direction with a view to frontload environmental issues in all development dialogues and efforts in the Kingdom. Literacy rates, secondary education and low poverty level rank among those best in the South Pacific. However, there is room for improvement. Optimisation of government performance, solicitation of foreign investment and correction of debt history are three of many areas that Tonga must seek to rectify in the future.

1. ECONOMIC SECURITY

Context

There are new challenges and opportunities confronting Tonga, which arise from changes in the physical, social and economic environment. These include the international pressures towards more transparency, accountability and good governance. Various public sector reforms have been implemented and new reform projects are in the pipeline with objectives to improve economic and financial management, and to improve the effectiveness and efficiency in public service delivery. The effects of globalization vary from country to country depending on the size of the economy but it is certainly important for the country to clearly and fully consider the opportunities as well as the risks of globalisation. The main threats to economic security and sustainable development in Tonga today are as follows:

- **Increasing size of the Government:** Tonga wishes to distribute development benefits more evenly to all parts of the Kingdom, i.e. from the more urban areas all the way to the more remote island settlements. In effect, indicators of social development in Tonga such as life expectancy at birth, literacy rates and access to safe water are at very satisfactory levels compared to the neighboring countries as well as to other developing countries. However, ensuring that health and education facilities as well as law and order are available to all citizens has demanded more service deliveries. Over the past years, total government expenditure increased pretty fast in comparison to domestic revenue collected and while cash grants received from abroad have declined, the financing requirements of the Government have put increasing pressure on public investments as well as the government's stock of debts.
- **Narrow tax base:** Small population and small private sector could only generate a limited amount of taxable income. Close to 70% of total tax revenue collected by Government is from taxes on international trade, with the tariff rates relatively high by international standards. Many economists see these as a barrier to the cross-border movements of goods and services and as further slowing the pace of domestic production. There are pressures from the international communities, especially the WTO, to shift revenue collection away from trade taxes, and to neutralize revenue needs by broadening and increasing the sales tax rates. However, the likely implications on the domestic economy of these reforms would be complicated, as local industries would suffer. Tonga's small population and small private sector may be too small to establish any economies of scale in tax collection that could finance the needed public services for all. As a result, tax rates would have to be imposed at a higher rate in order to meet the demands but this in turn would affect the disposable income available to the people.
- **High inflation:** Tonga's annual rate of inflation in the recent months has reached the double-digit figure. The combination of weak currency and vulnerability to external market shocks such as fuel price hikes, and expensive shipping freights have continued to put upward pressures on the imported components of consumer price index. At the same time, the tendency to rely on domestic borrowing would pump up the monetary base, and together with any booming sector effects from squash would affect overall inflation. The New Zealand and Australian dollars are at historical lows but as they are expected to return sooner or later, the imported component of Tonga's inflation is expected to rise further. With high inflation rate, the

purchasing power of the people will continue to decline, while the cost of living will remain high. Any real returns to investment will remain low.

- **Worsening balance of payments:** Like many other small island states, Tonga's balance of payments position continues to remain vulnerable to external shocks. Domestic consumption has been relying heavily on imported goods, and exports are marginal. Government is committed to diversifying exports and domestic production, but is lacking the economies of scale, which do not allow small states to compete internationally. The export base of the country is small and is being dominated by a handful of primary produce, squash, vanilla and fish. Fluctuations in the production and movements in the export prices of these commodities have significant effects on export earnings as well as gross domestic product. The significant inflows of private remittances, thanks to Tongans overseas, have contributed to the financing of the current account, but these are by no means sustainable and not enough to offset the current account. Foreign direct investment is small and Tonga's level of debt stock will constrain heavy reliance on overseas borrowing.
- **Constraints to foreign direct investments:** The Government is trying to address the constraints to foreign direct investment (FDI) but the lack of security; confidence, and certainty in land, resource access and tenure have stifled investment opportunities. The financing of the balance of payments deficit thus relies heavily on the country's foreign exchange reserves.
- **Increasing Government debts:** Government total debts have increased over the years but since the country is still enjoying the grace periods of most of the loans, the debt service ratio is still at a comfortable level.

1.1 Actions and Activities

Tonga sees economic and public sector reforms as the primary vehicle to achieve more sustainable growth. Tonga has participated in the annual Forum Economic Ministers Meetings, since 1997 and Government has used the action plans arising from those annual meetings as guides to its economic and public sector reforms. The main actions and activities that have been undertaken to achieve sustainable development in Tonga are as follows:

Development Plan: Government has endorsed the *Strategic Development Plan 7, 2001-2003*, with a vision to achieve an optimal socio-economic development¹ by year 2025. The vision declares:

"That by the year 2025, the Kingdom of Tonga achieves an optimal socio-economic structure achieved by overall national development." That is, the Tongan society will accomplish the following desired characteristics:

- high quality of life of the people overall;
 - high standard of living throughout the kingdom;
 - respect the option of both present and future generations;
 - high values and adaptive culture; and
 - individual fulfillment
- **Budgetary process:** Government recognizes the need to improve budget design, accounting and control systems, and the management of revenue and expenditure. A Program Budget Project was implemented in late 1998 to improve efficiency in financial management and to shift government budgeting system from line item budgeting into program budgeting. This would ensure that programs and sub-programs are prioritized subject to the budget allocations. Furthermore, a Strengthening of Budgeting Systems Project is

¹ Optimal level of socio-economic development is defined by the Plan as a society with high quality of life, high standard of living, sustainable development, adaptive cultures, gender equality, political stability and stable economic and financial environment.

ongoing to strengthen the existing budgeting processes through the development of core processes, policies and procedures; and to enhance financial management capacity and capabilities of the Ministry of Finance.

- **Revenue Collection:** A Revenue Strengthening Project is being carried out to restructure the revenue collection in order to enhance revenue collection through computerization and strengthening the manpower capacity and capability of the department. Another project is being created to reform the taxation system in order to reduce reliance on international taxes and to abide with the requirements of the WTO.
- **Civil service reform:** On the size of the civil service, a Civil Service Rationalization Project was carried out to identify the roles of the Government and make recommendations for right sizing of the civil service. Another project is in the pipeline with the purpose of improving the efficiency and effectiveness of public service delivery.
- **Private sector reform:** A project is being initiated to create of a policy environment conducive to increased investment and employment in the private sector. Reforms in the pipeline includes tax, tariff and customs reform; changes to the Industrial Development Incentives Act, foreign investment incentives, licensing and competition policy, as well as other public sector enterprises reforms.
- **Reform to Social security services:** Government is committed to the provision of a sustainable social security services. This includes the establishment of the Government Retirement Fund Board that is a civil service contributory scheme established to reduce the burden on the Government and more importantly establish a sustainable scheme thereby encouraging domestic savings as well as the mobility of the civil servants. The formulation of a medical referral scheme is also under consideration.
- **Financial sector reform:** A project is in the pipeline to strengthen the ability of the National Reserve Bank of Tonga to conduct monetary policy with market-based instruments and to strengthen the prudential regulations and supervision. The Government understands that offshore banking and allegations of money laundering have negative impacts on any country involved. Tonga has reviewed and repealed the Off-shore Banking Act and the NRBT has been allocated the authority to oversee foreign exchange control.

2. INTERNATIONAL TRADE AND GLOBALISATION

Context

Like many small island economies in the Pacific, Tonga has a very small land area, relatively high population density, and low per capita income. It is geographically fragmented and remote from metropolitan countries. These inherent characteristics, compounded by the frequency of natural disasters, have not only constrained the rate of development in the country, but they also limit the development options available.

- A small population is a bottleneck to the Kingdom's consumer welfare. The production of certain public utilities involves high overhead costs and thus needs a certain level of economies of scale in order to reduce the unit cost of production and thus cost of living. As a result, Tonga is unable to obtain an international competitive position due to its high cost structure. A small population also produces a small labour force, that is further weakened by emigration of the top of Tonga's talent pool to pursue better employment opportunities.
- With Tonga's small land area, the range of productive activities that could be undertaken is limited. The volume of domestic production is low, as is the range of commodities that can be produced. Domestic goods tend to concentrate on a small number of industries and commodities. This leads not only to domestic exports being highly concentrated on a few primary commodities but also domestic consumption and investment efforts are heavily dependent on imports.
- Tonga is inevitably vulnerable to both natural disasters as well as external market shocks. Exports are dominated by small volume primary commodities, such as squash; vanilla; fish and kava, that are sensitive to variations of natural processes (weather, disasters) and also sensitive to world markets.
- Tonga is a price taker in the international market, which is subject to fluctuations in world prices. Since the composition of its exports is dominated by squash alone, the island is confronted with less scope for counter export earnings. Limited production possibilities reduce Tonga's capacity to diversify and adjust to external shocks.
- Remoteness from large metropolitan countries is a logistical reality as the island Kingdom is faced with high transportation, communication and information costs that not only impede international factor mobility but also hamper the flow of commercial and technical know-how.

Globalisation is one of the most charged issues today, and to make matters worse, there are no bounds to its spread. The most commonly used term for globalisation is the economic sense, which refers to the observation that in recent years, a quickly rising share of economic activity seems to be taking place between people who live outside the country. For example, a growing share of spending on goods and services is devoted to imports from other countries, and a growing share of what a country produces is sold to foreigners as exports. Furthermore, firms based in one country increasingly make investments to establish and run business operations in other countries. Also, wealthy investors, mainly from the developed world, increasingly diversify their portfolios to include foreign financial markets (foreign bonds, equities and loans); while borrowers, mainly from poor countries, increasingly turn to foreign sources of funds. All of these forms of globalisation raise distinct issues and have distinct consequences.

2.1 Actions and Activities

The constraints to small island development are valid, and will always remain to victimize Tonga. Tonga cannot effectively compete in the international market with countries having better economies of scale in production and distribution. The global trading environment is rapidly changing and the margins for preferential treatment to small economies under agreements such as Lome and SPARTECA are rapidly eroding. However, Government recognises these constraints, and its domestic policies are being adapted to meet the challenges of this changing environment.

- Government has applied to accede to WTO and domestic policies are now tailored to be consistent with WTO principles and obligations. At the same time, with assistance from the Commonwealth Secretariat, Government is exploring the negative impacts of WTO agreements on the country, such as the erosion of special treatment schemes that enabled small economies to survive the competitions of large countries in the international markets.
- There is a series of discussions to form the Pacific Regional Free Trade Agreement (PARTA).

- Tonga has harmonized the System of Custom Tariffs in order to facilitate consistency and comparability in the flow of international trade.
- Studies, with the help of the PFTAC, have been undertaken to revise the Tax Structure in order to shift revenue collection from taxes on international trade and custom duties, to a more direct taxation system, by broadening the existing sales tax system.
- A tax reform proposal is being prepared to submit to Cabinet with a prime purpose to facilitate domestic production and shifting tax collection from the wharf to the distributive trade stores.
- Studies and reviews of the IDI Act and foreign investment regulations have been undertaken.

3. GOVERNANCE AND ACCOUNTABILITY

Context

Good governance is fundamental to the success of economic reforms. Government expenditure is about 40% of gross domestic product, which is high by international comparison. As mentioned above, the revenue collection capacity of the Government cannot keep up with the increasing size of the Government, and it has reached a point where revenue collection, particularly from the international trade taxes, poses threats to private sector development.

3.1 Actions and Activities

The Government understands that the implementation of the Eight Principles of Accountability formulated at the 1997 FEMM is important in promoting good governance and accountability. It is committed to rationalizing the public service and also to tackling certain corruptive practices in the public sector. Tonga is progressing well in this regard:

- An Ombudsperson for the public complaints has been created.
- Ongoing work is being done with regard to programming the budget where efforts will focus on a clear performance measures and ways to assess them.
- Corporate plans for each Ministry and department have been formulated to give clear indications of their roles, and ways to achieve those roles.
- A project (EPSRP above) is in the pipeline to modernize the current Public Finance Act.
- There is also a greater transparency with regards to the preparation of the Government Budget where there has been an increased discussion with the relevant stakeholders.

Chapter 2: Human Resource Development

Context

The national assessment of Human Resource Development (HRD) in Tonga comprises of Education and Traditional Knowledge; Urbanisation; Population/Health Issues; and Strengthening the Role of NGOs and Women

Tonga has made huge investments in its people. This is reflected through the high literacy rate (99 per cent) and the high level of education amongst the population. With Tonga's economic crisis, and very narrow economic base, many young and well-educated Tongans seek 'greener pastures' to emigrate to find work.

Urbanisation

The Government of Tonga has identified urbanisation as one of its priority areas in the Strategic Development Plan VII.

Population/Health Issues

The four main areas for priority consideration are Family Planning Services; Reproductive Health Services; Sexually Transmitted Disease/HIV/AIDS Prevention Programme; Basic Research, Data and Population; and Development Policy Analysis Program.

Strengthening the Role of NGOs and Women

The WID Centre of the Prime Minister's Office was established in 1993 when government recognised the many contributions of women to national development. The Centre is responsible for the overall coordination of women's activities in Tonga. Part of the most important achievements in this area is the approval of the Gender Policy by government.

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

- **Scholarships and Training Courses**
Scholarships are offered for studies and upgrading of qualifications for diploma, degree and postgraduate qualifications in Pacific regional institutions such as the University of the South Pacific.
- **Tonga Schools Institutional Support Project**
This involved assistance for a comprehensive teacher development framework for pre-service primary and secondary teacher training.
- **Community Development and Training Centre**
To improve the quality of tertiary studies in agriculture, accounting and business by establishing links between Tonga's Community Development and Training Centre, the University of Melbourne's Faculty of Agriculture, Forestry and Horticulture and the Swinburne University of Technology.
- **Primary school buildings**
The Government of Tonga, with New Zealand, have funded upgrading of the schools learning environment and teachers facilities to encourage student development.
- **The Population Unit**
Established at CPD with assistance from UNFPA, AusAID and the Government of Tonga. In addition, a Population Steering Committee was formed.
- **National Population Policy**
Held to design a National Population Policy, with regional representatives, coordinated and implemented by the CPD in collaboration with the Population Steering Committee.

- **Women in Development Centre**
The Government of Tonga approved in 1993 the establishment of the WID Centre as the central body and arm of government to deal with women's activities in Tonga.
- **Gender Support Facility Project**
UNDP funded for Tonga a Gender Support Facility Project. This involved Institutional Strengthening for the Langafonua 'a e Fefine, and the formulation and consultations on the National Gender Policy. The Government of Tonga has approved this national policy on Gender.
- **Gender and Development (GAD) Projects**
To assist national mechanisms for the advancement of women's development, as well as broaden women's participation in social and economic development.
- **Women and Children Crisis Centre**
Established and constructed as a safe house for battered women and children. The centre offers counseling and is a safe-house for battered women and children.

Assistance has also been provided by AusAID, NZODA, UNICEF, UNESCO, UNFPA and UNDP for small projects related to Health and Educational issues.

Community responses:

Civil Society Organisations have been highly active in the areas of Education and Traditional Knowledge, Urbanisation/Settlements, Population/Health Issues, and Strengthening the Role of NGOs and Women. Specifically the following activities were led by Civil Society Organisations or together as partnership with the relevant Government agency:

- Providing skills training workshops on micro-enterprise income-generating activities, such as fabric printing/dyeing workshop to train women in fabric art, sewing workshops, floral arrangement, coastal fishing, self-managed lawn-mowers, etc.;
- Conducting training sessions in home gardening and traditional medicine;
- Established Alcohol & Drug Awareness Centre;
- Conducting a pig fencing project to improve local sanitary conditions;
- Establishing community health facilitation teams in various villages and communities;
- Operating a Kindergarten and two village pre-school groups;
- Operating a life skills programme focusing on English language development;
- Training workshops for women and youth on human rights and good governance;
- Providing overseas youth training seminars;
- Conducting research on issues affecting women in Tonga;
- Family health and adult informal education training through Village Women's Development Programme;
- Training on family nutrition & home gardening for family food security;
- Production of television programmes to raise awareness of women's development and environmental issues in Tonga;
- Implementing and overseeing the building of fence pens for domestically raised pigs;
- Supervised the building of smokeless stores and drum ovens;
- Alcohol and Drug Awareness Centre has expanded into many areas under the broad heading of Healthy Lifestyle Choices. Includes education re basic hygiene, HIV/AIDS education and care of PLWHA;
- Participation in the workshop on National Strategic Plan for HIV /AIDS in Tonga, strongly support public mobilization to prevent HIV infection;
- Training on family health and prevention of common communicable diseases incorporated into community training programmes, and linked to community health facilitation teams in various villages and communities;

- Primary focus of village development activities is domestic water supply, home sanitation, family nutrition, etc.;
- Actively involved in HIV/AIDS education through community drama programme;
- Pesticide Awareness Programme promotes wiser and reduced use of pesticides, and introduction of alternatives;
- Organizing land filling and home improvement projects in swampy settlements;
- Conducted workshops to train women's groups in the construction, use and maintenance of smokeless stores and drum ovens;
- Established a revolving "loan" fund to financially assist members in their development activities;
- Villages Inspection carried out regularly to support training programmes the resource personnel have encouraged the improvement of stressed;
- Networking with village communities and village women committed to beautifying their villages and home environment;
- Workshops on the Elimination of Discrimination against women;
- Working towards lobbying government for constitutional changes and amendments to the Land Act. This hopes to alleviate if not eradicate discrimination against women in terms of property rights;
- Research on Women's Issues and predicaments in Tonga and will be broadcasting before end of the year a TV programme exposing the existing situation of Women and whether the State in Tonga has adequately fulfilled its role as a major provider for these citizens;
- Lobbying government for removal of existing barriers to women's full participation, and for ratifying international conventions relating to the status of women;
- Participatory development programmes provide leadership training to women and women's groups on decision-making, planning, resource management, etc, and provide training and support for sustainable development activities in the outer island regions, producing a more capable and aware populace;
- Working with the Department of Environment and 2 other national NGOs in filming and producing fortnightly programmes for television addressing environmental issues affecting Tonga;
- Establishing an environmental community group, the Tonga Environmental community Advisory Network (TECAN);
- Successfully conducted youth workshop on human rights and good governance. Increased critical awareness and understanding of United Nations and Commonwealth Agreements relating to human Rights, rights of women, laws of Tonga, good governance, role of Parliament, Judiciary and the Media;
- Instrumental in identifying training opportunities and securing sponsors for interested youth in any areas vital for sustainable development;
- Active on issues of environment and resource protection. THRDM called on Tongan Government to claim ownership over marine organisms, to have naming rights over new organisms found within Tonga's geographical and legal jurisdictions. (Tonga has rights of ownership over natural resources under WTO [2], CBD [3]and UNCLOS [4]);
- Promotes smart partnerships and participatory networking with variety of NGOs in Tonga. Active member of several NGO networks;
- Provides "seed money" as starter package for group fund-raising activities, and encourages self-held financial activities, provides basic financial management training for groups;
- Village Environmental Programme to raise the public Awareness on the importance of living in a healthy environment, and the importance of preserving the environment for future generation;
- Dissemination of information through its radio programme, newsletter and meeting in the communities;
- Coastal Clean up and pick up Rubbish in town center with youth groups and clean up village & beach by Youth Groups;
- Incorporate schools to do clean-up & rubbish picking activities;
- Meetings with communities on how to manage the resources on the coastal areas;
- Posters & magazine has been distributed out to community and schools about bad effects of throwing rubbish into the ocean;
- Environmental Education Programme introduced environmental issues into school curriculum, and provided teaching resources for teachers;
- Incorporates environmental awareness activities into all environmental programmes: pesticides, social forestry, composting, waste management, etc.;

- Register & conduct CLEAN UP THE WORLD CAMPAIGN together with Youth Congress and Australian High Commission the Clean Up Tonga; and
- Village Women's Development Programme provides training and support for sustainable development activities in the outer island regions, producing a more capable and aware populace.

2. *INSTITUTIONAL FRAMEWORK*

2.1 Coordination and Decision Making

The Minister of Education is responsible for the policies, direction and general administration of the Ministry under the power granted by the 1974 Education Act. The Prime Minister is the Minister responsible for all the monitoring and coordination of womens' development activities.

2.2 Legislative and Policy Platforms

From the current and previous Strategic Development Plans (6 and 7, 1991-1995 and 2001-2003), the focus for Public Investment has always been on Education amongst other priority areas. As such, the current plan focuses one of its areas on Developing Human Resources Including Youths and International Sports.

3. *CAPACITY BUILDING*

3.1 Education and Training

Several training courses are conducted according to availability of funds. Most of these courses are income-generating activities to enable women to contribute to their families. In some cases, there are opportunities for overseas training courses.

- **Vocational and technical education**
To improve the quality of life and life opportunities for students and communities especially those in the outer islands through education.
- **Qualifications Authority**
To assist with the establishment of a Tonga National Qualifications and Assessment Board.

3.2 Communication and Awareness

A wide variety of consultation has been done by the WID Centre on development activities and on the policy. This had been in collaboration with the Langafonua 'a e Fefine Tonga organisation. Several information leaflets are distributed both by WID and Langafonua. In addition, Langafonua also has a monthly radio program for its members' information.

4. *NEEDS AND CONSTRAINTS*

- Lack of appropriate data and analysis to assist in decision-making and distribution of information.
- Level of national commitment to priority issues identified at international conventions/meetings.
- Limited resources and timeframe to efficiently carry out activities.
- Lack of skilled people in identification and the implementation of development activities.
- Limited capacity of Civil Society Organisations and the lack of resources from Government to support them.

Specifically from the Civil Society organisations, the following needs and constraints were highlighted:

- Insufficient funding, supplies and lack of space/venue for practical works;
- Long term access to training equipment is limited;

- Self management skills need developing;
- Poor sense of ownership from those using the system;
- Potential exists for future expansion;
- Personnel resources a limiting factor;
- Non-transparent nature of government leads to: lack of access to government sources, lack of co-operation from government officials to produce requested information;
- Programme outreach geographically limited islands due to insufficient resources to cover entire Kingdom;
- Lack of cooperation between relevant sectors;
- Respecting Human rights is central to combating HIV/AIDS. Human Rights is new and challenging to the public, people question its ethos;
- Duplication and too many projects with village women means these women have too many projects to handle at one time;
- Some CSO members are unconvinced of the importance of certain activities;
- CEDAW and other important international treaties relating to women not yet ratified, so women's rights not institutionalized in the current legal framework;
- Scope of programme could be extended to new areas if resources were available;
- The challenge is to identify and developed local leaders capable of assuming complete command and all international liaison;
- Tongan NGOs still have difficulty with complete openness and transparency when working together.
- Self management skills need developing;
- Financial resources limit seed money distribution;
- Sectoralisation of development;
- Inadequate cooperation between recipient and country of origin of deported criminals;
- Lack of protection for local entrepreneurs.

Chapter 3: Land Resources

Context

Land, as defined by the Land Act of Tonga, includes all land and its resources such as biodiversity (Chapter 10) and minerals. This definition includes land above water or below water (the seabed, coastal area and resources up to 50 feet from the high water mark) (Chapter 4).

Tonga is a small island nation with a land area of about 750km², a population of 97,000 dispersed over 36 inhabited islands in addition to 140 uninhabited islands. Volcanic action is common in Tongan waters. Minerals, such as precious metal, stones, coal, petroleum, earthly minerals, and metalliferous minerals, of real commercial value have yet to be discovered in Tonga.

All land in the Kingdom of Tonga belongs to the Crown. It is divided between the King's, the Royal Family's hereditary estates, the Nobles and chiefs hereditary estates, and Government land. The last two estates are subdivided into allotments for the rest of the people of Tonga. The land tenure regulation stipulates that every Tongan male over the age of 16 is entitled to a tax allotment of 3.3 hectares for farming, and a town allotment of 1,618 square meters for residential purposes, all of which is hereditary through the eldest male (heir). Women can only lease land or hold land in trust for their male heirs or husbands. Sale of land is prohibited, however allotments have been used as mortgage for bank loans.

The driving forces that impact or change land resources are:

- population density
- settlements, and
- different forms of land use.

A. Population density

Population growth has intensified the demand for land, and regulatory entitlements can no longer be fulfilled. In 1994, total tax allotments reached 15,485, town allotments were 13,609 and 3,736 leaseholds. By the year 2000, registered tax allotments increased by 3.5% (to 16,021), town allotments increased by 13.2% (to 15,406), and leaseholds increased by 29% (to 4,818). As to be expected, land registration was recorded at its highest in Tongatapu, accounting for 53% of tax allotments, 32% of town allotments, and 78% of leaseholds for the year 1994. During the five-year period, a 10% decline in town allotment registration for Tongatapu suggested that pressure for space at Tonga's main commercial centre has compounded against limited available land. Leasing of land is as common as registering land and leases have different terms depending on the purpose, commercial or non-commercial.

The population density varies drastically from one island to the next. The density of Tongatapu increased from 244.9 people per sq. km. in 1986, to 259.1 people per sq. km. in 1996. There is a high migration rate from the outer islands to the main island in each island's division as well as into Tongatapu, the main island and into Nuku'alofa, the capital. There is also a high rate of out-migration from Tonga to overseas countries.

The most recently available data on land holdings indicate that only 35 percent of the 1996 male population could have been accommodated if they had chosen to exercise their rights to a full grant of heritable land as provided by the law (MLNSR 1999).

B. Urban and Rural Settlement

53.8% of the total population of Tonga live in rural areas, while 38.8% live in urban areas. Of the 38.8% urban population, 79.0% live in the Greater Nuku'alofa area, while only 11.0%, 6.6% and 3.5% live in Neiafu, Pangai and 'Ohonua respectively.

As a result, agricultural land (tax allotment) around the periphery of Nuku'alofa has been subdivided for settlements. The greater Nuku'alofa area has a migration rate of 37.3% (Statistic Department 1999).

Following Cyclone Isaac in 1982, new settlements in Popua, Sopu and Tukutonga were emerging (Table 1) to the North East and North-West of Nuku'alofa, and became the 'swampy and squatter settlements' of Nuku'alofa. These settlements are on areas where mangroves were removed to build houses, and are subject to frequent inundation from the sea or by heavy rain, poor drainage and water tend to stay on the surface for a long period of time. Residents of the three towns face high health risks from water-borne diseases and sewage problems, environmental problems such as pollution, and smoke from the nearby Popua public rubbish dump.

Table 1. Settlements in Swampy/wetlands Areas

Settlements	Number of People	Number of Households
Popua	1,206	180
Tukutonga	341	55
Sopu	1,624	440
Total	3,171	675

Source: Derived from the 1996 Census

These settlements represent 10.6% of the total urban population of Tongatapu. It shows that quite a significant percentage of the urban population live in environments where hazards and health risks are significant.

C. Land use

Agriculture: (Other forms of land use are discussed in relevant chapters)

The influences on the land resources are overlain by centuries of human influence, which has included intensive agriculture. The two most profound changes in the agricultural systems in Tonga were the switch from a traditional agriculture system to a large-scale planting of coconuts around the turn of the century, and the increase in cash cropping.

Traditional agriculture in Tonga is mainly intercropping with rotational farming. It is essentially a multi-story agroforestry system. Cash cropping in intensive horticulture production (squash, watermelon and vegetables) requires high inputs of fertilisers and pesticides, larger land area and clearing of the land for mechanisation. A lot of agricultural lands including bush allotment where the landholder has migrated enter into agricultural leasehold arrangement. However, sustainable management of the land and its resources is not a condition or criteria in the lease arrangement.

Forestry:

Only limited areas of indigenous forest remain in Tonga (refer to Chapter 10 on Biodiversity).

Of a different management nature, the government forest plantation in 'Eua consists of exotic species for timber. The plantation area has important corridors of indigenous forest that protect 'Eua's water catchments. The 'Eua community has complained of 'dirty' water especially during and after periods of heavy rain.

Increased fragmentation and disturbance promote the introduction and spread of invasive weeds and pests into the remaining natural forest, threatening the integrity of these areas. The coastal forest strip, which serves the essential function of preventing shoreline erosion and protecting inland agricultural and inhabited areas, has been dramatically reduced in extent (Wiser et al., 1999). Human related disturbance is common in all forest types and in most forest patches. Tracking is common, as is cutting of stumps or branches (usually for firewood). Bark stripping (generally for the preparation of extracts for medicines, fragrances etc.) is a common practice.

Changes in Land Cover:

Land cover refers to the physical state of the land surface and includes vegetation, soil, rock, water and man-made structures.

Land, particularly in Tongatapu, is becoming increasingly scarce. Subdivision and allocation of areas such as mangrove swamps into tax allotment (although crops wouldn't grow in these area) only open up these areas to become illegal rubbish dumps or destruction of indigenous tree species for construction and firewood. Town allotments are also allocated from these areas but sanitation is a problem due to constant flooding, being very low and the water table high. As this trend is not likely to change, a regime for environmental conservation, encompassing not only pollution control but also land-use planning and the exploitation of natural resources on a sustainable basis, becomes imperative.

There is lack of historical data to determine the trends in the change of the land cover.

Free-Ranging Domestic Animals:

The presence of free ranging, unpenned animals, particularly pigs and goats, is a common problem in Tonga and is widely reported in village meetings. Women's organisations reported that this has become a major environmental problem in Tonga. Roaming pigs, dogs and goats have led to the destruction of vegetation, crops, valuable trees and disrupted attempts for replanting thereby creating unhygienic conditions in towns and villages.

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

- **Biological control: (MAF)**

Several programmes are under way to use biological controls to reduce the need for pesticides. This includes biological control of the banana weevil borer, parasites for leaf mites and nematodes to kill the kava beetle and sweet potato pests, as well as viral disease for rhinoceros beetles.

Tests are being made at the Vaini experimental farm on intercropping techniques to reduce plant diseases and pests.

- **Improved genetic planting material (MAF)**

Disease resistant planting materials (e.g. kava, vanilla etc. are raised in the MAF Research and trials before releasing to farmers.

- **Improved awareness programme**

Attempts have been made to translate instructions of agrochemicals materials into the Tongan language, as well as farmers training. Government-assisted committees, such as the District agricultural committees are important forum for the discussion of agricultural development at the district level or for the preparation for the Royal Agricultural Show.

- **Forestry Nursery (MAF)**

The Forestry Division branches in Tongatapu, 'Eua, Ha'apai and Vava'u nurseries have raised native trees and exotic species, and these are sold to the public at very low prices.

- **Guidelines for town planning**

Cabinet approved in 1994 a set of policy guidelines for town planning purposes as a response to rapid growth of land development in commercial areas. This guideline however, is not strictly enforced.

- **Hawaii & Pagopago Estate Project**

The objectives of the investment project were to improve Tonga's marketing strategy and provide an opportunity for Tongan farmers to extend their agricultural boundaries and to ease pressure for agricultural

lands in Tonga. The Tongan government supported the project investment by providing an allocation of more than TOP 3m during 1998 - 2000.

- **Inventory of the Coconut Palm Resources, Kingdom of Tonga**
The project was funded by NZODA to take stock of coconut palm resources in Tonga and coordinated by MAF.
- **Economic Assessment of 'Eua Forest Farm (Plantation)**
A study, funded by NZODA, determined the commercial viability of the 'Eua Forest Plantation.
- **Women in Forestry Development Program**
Women's development groups participate in Agroforestry development promoted tree planting, purchasing seedlings, distributing and planting ornamentals, fruits and cultural species. Women's community groups are supported by the MAF and DoE through project development, technical advice and training.
- **Institutional strengthening MAF**
ADB (1997) loan scheme for Outer islands agricultural development was developed for Niua & 'Eua. Aims at developing the skills and abilities to respond to technical and marketing queries by commercial private sector farmers & merchants, as well as informing growers & exporters of new marketing opportunities and production.
- **Coastal Forest Protection and Rehabilitation**
SPREP provided funds to the MAF to establish a pilot project aiming at protection and rehabilitating the coastal forests from 1993-1995. The project sites was Houma through to Ha'akame village and extending west to the Blow Holes area. A strip of coastal land about 1.5 km long and 5-30 m wide of coastal area was cleared and planted with 200,000 seedlings of different species.

Civil Society Responses:

In particular response to the decrease of medicinal and culturally important plants, there are several Non Government Organisations and community groups who carry out tree planting programmes. These are women's village development groups at the grass root level, including Langafonua-'a e-Fefine Tonga (the National NGO umbrella for all women's organisations in Tonga), 'Aloua Ma'a Tonga, the Tonga branch of Pan-Pacific South-East Asia Women's Association (PPSEAWA), and the Tonga Community Development Trust (Tonga Trust) with it's Village Women's Development (VWD) Programme. The women's groups together with the MAF, DoE and the Tonga Visitors Bureau encourage tree planting through village competitions and inspections.

The above NGOs in collaboration with the Government and the private sector have raised awareness of the communities on the issues of land degradation through the following activities:

- Consultation with women on replacing and replanting trees that have been damaged by cyclone or sea sprays or is getting scarce
- Social/Community Forestry Programme promotes replanting of valuable trees on available community, domestic and agricultural land. Species include handicraft species, medicinal species, food/fruit species, ornamental species, and cultural species.
- Working with local landholders to preserve fragments of native forest.
- Acquisition and documentation of information of native species, uses, etc
- Promoting the use and value of non-timber forest products (NTFP).
- Overseeing the planting of pandanus and mulberry trees to ensure sustainable resource management for traditional crafts
- Promotes collection and establishment of seed banks as part of Pesticide and Sustainable Agriculture Project
- Pesticide Awareness Project provides training on appropriate use of pesticides, labeling and interpretation, disposal, etc

2. INSTITUTIONAL FRAMEWORK

2.1 Implementation and Decision Making

The MLSNR is charged with the responsibility surveying land for the purpose of allocation, land registration, mapping, granting leases, etc. under the Land Act (CAP 132), plus mineral resources in accordance with the Minerals Act (Cap 133) and Petroleum Act (134). Forest resources and agriculture are administered by the MAF in compliance with the Forestry Act of 1961. Government restructure created a new DoE effective July 2001, from the Environment Section of the MLSNR. However, policy and legislative functions of the MLSNR used to be carried out by the Environment Section are yet to be amended to reflect the new restructure as the trained manpower in areas of environmental planning, assessment, monitoring, management and sciences plus the technological resources are with the new DoE.

Inter-Departmental co-ordination in land resources management matters was often carried out in an often ad hoc basis.

2.2 Legislative and Policy Platforms

There are over 20 legislations containing provisions of environmental importance that are related to the development of land resources, reflecting the Government's concern and response for land development. Viewed together, this group of legislation may seem to provide a reasonably comprehensive regulatory programme to protect and advance the objectives of land resources development.

However, despite the good intentions of the legislation, law enforcement has been difficult, as resources in terms of finance, tools/equipment and manpower for implementation and enforcement have not been provided.

For example, since the Forestry Act of 1961, there has not been any 'village forest' reserved. Section 22 of the Land Act prohibits cutting of trees within the 50 feet of the high water mark, yet this is the area where the collection of medicinal plant resources, firewood and wood for light construction purposes have been carried out. Although the Town Regulations (Public Health Act) and the Bounds and Animals Act 1903 prohibit littering in public places, cutting of trees and free roaming of animals, these have become major environmental hazards throughout Tonga. In fact, most of the legislation that has provisions for environmental protection and conservation are either no longer appropriate to issues in Tonga, no longer enforced, or in need of revision (Pulea, 1992 and Prescott, 2000). Moreover, the existing legislations that could support sustainable management of land resources are not having any effect due to lack of co-ordination among agencies, implementation and enforcement.

Notably, there is a lack of specific legal provisions for soil conservation, although the MAF does offer advice on this area.

The growing pressure for land policy review is a strong indication that perhaps the A Land Commission² should be revived with a wider representation. Amendments to the Land Act are currently being undertaken, which will facilitate needs for increased accessibility to land, improved land revenue collection, and better town planning.

2.3 Cooperation & Participation

- **International Conventions and Donor Funded Projects**

Government's participation and membership in various regional and international inter-governmental organisations, bilateral and multilateral, international NGOs, and related international conventions have also initiated projects to address land use problems, loss of biodiversity, diversification of agriculture, soil erosion, etc. Such programmes include the following:

² Established in the 1970's, inactive since the 1980's, membership of the Commission was predominantly members of the MLSNR

- NZODA survey and mapping of indigenous forests
- Japanese technical assistance for livestock development
- FAO, Pacific Plant Protection programme
- AusAID and NZODA community involvement activities in replanting, training and capacity building programmes

3. *CAPACITY BUILDING*

3.1 Education and Training

Most donor funded projects include on the job training or formal training. Identifying of training needs is the responsibility of each agency.

3.2 Communication and Awareness

Most communication and awareness programmes are linked to donor funded projects. At the end of a project, there is limited funding from the government and the private sector to continue related TV and radio programmes as well as newsletters or local paper articles.

Civil societies are very much involved in this area (refer Civil Society responses).

4. *NEEDS AND CONSTRAINTS*

- There is a need to improve the technology/equipment used to expedite registration, mapping, and surveying³ that often delay land related development projects;
- Tonga's sustainable natural resource management continues to rely intensely on foreign aid;
- There is an urgent need to enact the EIA Bill;
- There is a need to consider environmental impacts of major land development projects as addressed in the EIA Bill;
- Institutional attitudes and practices (power struggle) have to be changed to expedite services and share government's manpower expertise and limited resources;
- There is a need to ensure that agricultural crops genetic diversity is not further eroded;
- Multiple demands on limited land resources has to be addressed in an intergraded manner;
- Land resources are increasingly vulnerable to extreme weather conditions;
- There is a lack of institutional co-ordination;
- Unclear and overlapping responsibilities on land resources matters results in negligence;
- There is a need to strengthen replanting efforts nation wide to minimise soil erosion in 'Eua and Vava'u, coastal erosion nation wide, and to revive threaten tree species and rare species;
- There is a need to improve sustainable production and yields from limited land area; and
- There is an urgent need to diversity exports opportunities for Tonga to relieve pressures on land resources.

³ The backlog of survey services has been a long-standing problem during the past 20 years.

Chapter 4: Coastal and Marine Resources

Context

The sea and its coastal resources have provided for the livelihood of Tongans since the inhabitation of the islands. The sea and its resources as well as the coastal areas (from 50 feet above high tide watermark) are Crown property and the rights to all resources (sand, dead coral, marine life) are vested in the Crown (Constitution of Tonga and The Continental Shelf Act, 1970). However, in contrast to land access, anecdotal evidence points to a long-standing tradition of open access to marine resources.

The major marine ecosystems in Tonga are of algal and seagrass beds; algal, barrier, fringing and lagoon reefs; rocky coasts; beaches; open lagoons; marine lakes; marine caves and a submarine trench.

Coastal Development is the driving force that has shaped the coastal area. Waterfront development in Tonga has been limited to the construction of wharves, jetties adjoining major towns and villages, and housing developments in mangrove swamps. This is done with very little precautions to prevent siltation of the marine environment during the activity. Several causeway constructions to link outlying islands to the main islands have been completed. However, causeway constructions have resulted in the death of corals on the lagoon side, and fishermen have complained of a decrease in fishing productivity in the area.

Sand Mining

The rapidly increasing rate of construction of houses and buildings, using primarily cement blocks and cement foundations, has resulted in a rapidly increasing demand for sand. Sand is surface-mined from the beaches by the Ministry of Lands, Survey and Natural Resources and then sold to the public. In addition, a great deal of sand is 'stolen' from the beaches.

The environment impact of present beach-mining activities is very obvious in Tonga, as many of the more popular beach areas have already been stripped of sand and are now no little more than beach rock (Per.obs.). Offshore sand deposits have been found that may be suitable for cement aggregate, but the cost involved in dredging, and other environmental effects such as siltation and habitat disturbance, make the extraction unsustainable. The Ministry of Works is investigating alternative sources of sand such as crushing screening quarried limestone or sawn coral blocks from quarries (MoW, 1999).

Limestone quarries

Limestone rock is mined on all the major islands, and used for road construction and maintenance, as filling or aggregate for construction. There are 12 quarries in Tongatapu, 6 in Vava'u, and 2 in Ha'apai. Depending on the terrain of these islands, land is left exposed to salt sprays and erosion which in turn will impact on vegetation and surrounding waters.

Fisheries

The reefs and lagoons are the prime fishery for subsistence supplies. In addition to fishing, a wide range of shellfish and other marine life are harvested from the tidal flats at low tide for consumption or for production of shell handicrafts for sale to tourists.

The three categories of Marine Fisheries Resources in Tonga (offshore, bottomfish, and inshore resources) vary in magnitude and are subjected to different levels of exploitation. The offshore resources, primarily four species of Tuna, are only lightly utilised and form part of a large regional resource. Management and conservation action such as minimum sizes, export controls and closed seasons are required immediately. Any increase in benefits from Tonga's inshore resources will probably be from increasing the quality of the product through, for example, improved processing or handling techniques, rather than increasing the volumes of landings. Recognising the potential for the development of the fisheries resources, the Government of Tonga established in early 1991 the Ministry of Fisheries.

Tonga faces many challenges in fisheries management and conservation. Unlike other Pacific Island countries, there is no strong heritage of traditional marine resource management. Although the Fisheries Act 1989 provides for regulations with management authority, they have not yet been approved. Although there is a legal requirement for management plans for all fisheries, few to none exist to date. The management section of the Ministry of Fisheries is not well developed. Important and logical management measures have encountered substantial opposition from business interests.

1. ACTIVITIES & PROGRESS

1.1 Programmes and Projects

- **Development of Appropriate Legal Framework**

A new Fisheries Bill was developed to make provisions for the development of co-management of the coastal fisheries resources and to address the inefficiency of the central management.

- **The UNDP/GEF-funded Regional Strategic Action Programme (SAP) for the International Waters of the Pacific Small Island Developing States, executed by SPREP**

"International Waters" is one of the focal areas of GEF. This regional initiative is assisting Tonga in two components, the oceanic and the coastal. The oceanic component focuses on strengthened collaborative mechanisms for the sustainable management and conservation of the western central Pacific tuna resources. The coastal component is to assist in improving local communities capacity and processes for the design and implementation of sustainable resource management and conservation programmes in Tonga.

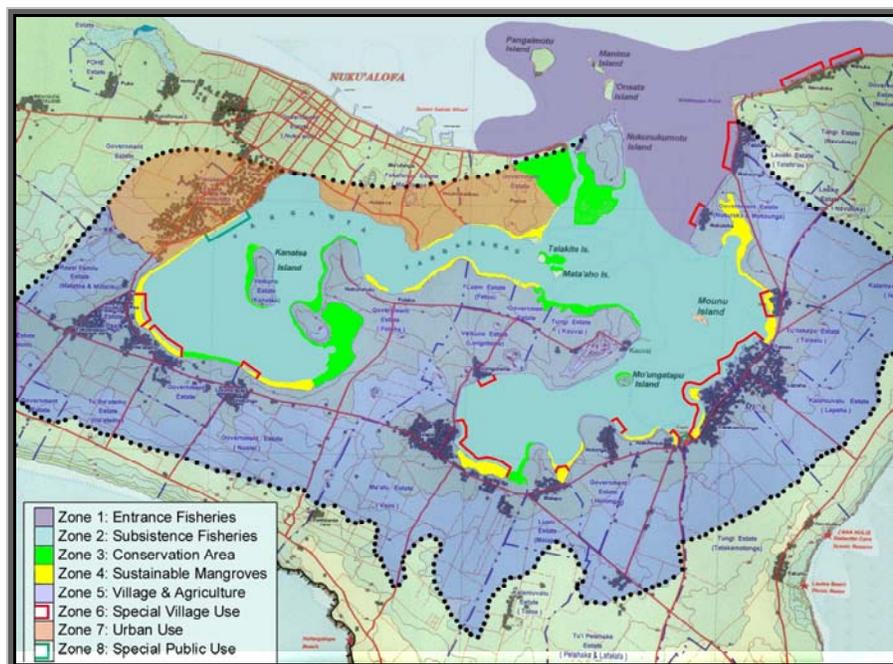
- **Environmental Monitoring**

Established by Cabinet of the National Environment Monitoring Committee to be responsible to environmental monitoring of coastal waters, lagoons and to conduct State of the Environment Reporting.

- **Coastal Area Management Planning**

This Environmental Management Plan (EMP) has been developed by the Department of Environment (DoE) in collaboration with ten other government agencies⁴, three NGOs⁵ and communities around Fanga'uta Lagoon (Figure 1). It has been prepared in response to increasing unease felt by communities and government departments which have interests in the lagoon and its resources, and in response to results of surveys of the lagoon system's physical and biological status.

Figure 1: Map of Fanga'uta and Fangakakau Lagoon showing the various zonations



⁴ Ministry of Education; Ministry of Fisheries; Ministry of Works; Tonga Water Board; Ministry of Health; Ministry of Agriculture & Forestry; Ministry of Labour, Commerce and Industries; Ministry of Marine & Ports; Tonga Visitors Bureau; Central Planning Department.

⁵ Langafonua, Tonga Trust and 'Aloua ma'a Tonga.

- **Aquaculture Research**

Most of Tonga's aquaculture work has been financed through foreign aid.

Aquaculture research and development work in Tonga has typically fallen into two main categories:

- Production aquaculture, i.e. culturing of organisms intended to result in the production of edible or saleable products for domestic consumption or export. This category includes the substantial volumes of work done over the years on farming of mullet, milkfish, tilapia, seaweed, mussels, edible oysters and pearl oysters, as well as some work on giant clams;
- Reef re-seeding, i.e. the mass production of juveniles for restocking of depleted wild fisheries. This includes work on giant clams, trochus, and green snail.

- **Seaweed (limu tanga'u) farming and export trial.** (FAO, SPADP)

- Trial export of seaweed of the species *Cladosiphon sp.* from Tonga. This species is very similar to the species in Okinawa but the Tongan type has superior processing qualities necessary for boiling, drying, seasoning, etc.
- Start-up farming of "limu tanga'u" for export purposes, and to fill in the gap of abundance and availability from the wild.
- Transfer technology to local farmers

- **Conservation and Management Project** (JICA)

Focussing on education & awareness by producing video tapes, holding poster competitions (Secondary school and Primary school), and distributing of calendars and posters to all schools and the public.

- **Strengthening and improving education and awareness programme.** (FFA/ Project Development Fund under US Treaty Fund administered by FFA)

- **Improvement of smoked seafood quality training for women.**(UNDP)

In-country training for women for improving quality, processing methods and marketing of processed marine products. Videotape had been produced as the successful result of this project in Ha'afeva.

- **Beche-de-mer Stock survey. 1996.** (South Pacific Commission)

This stock survey was conducted by SPC staff in collaboration with Tonga Fisheries to determine the status of the stock that had been heavily exploited.

Cabinet approved that a ten-year moratorium, in 1997, be imposed throughout the Kingdom on the harvesting of sea cucumber for export. These measures were introduced in order to allow the stock to recover. The measures do not affect subsistence harvesting for local consumption.

- **Aquarium Fish Survey and Management Recommendation.** (South Pacific Commission)

Surveyed and assessed the stock status of aquarium fish species and coral coverage around Tongatapu.

- **Fisheries sector study. (FAO and AusAID)**

A complete review of the fisheries sector in Tonga conducted by eight consultants. The study produced reports (3 volumes) and Cabinet considered and approved in principle some of the main policies arising out of the study.

Civil Society Responses:

Civil Society Organisations reported the following achievements and activities in the sector of "Coastal and Marine Resources":

- Cleaning up and rehabilitating beaches throughout Tonga;
- Established a sustainable fishing programme for small-scale fishermen;
- Public Awareness Programme on environmental issues twice a month through Radio;
- Meetings with communities on how to manage the resources on the coastal areas;
- Training programmes for women and youth on Post Harvest (i.e. handily processing presentation of seafood;
- Posters & magazine has been distributed out to community and schools about bad effects of throwing rubbish into the ocean; and
- Undertaking the rehabilitation of lagoon sites in 14 communities and education of community members in the importance and maintenance of this ecosystem.

2. INSTITUTIONAL FRAMEWORK

2.1 Implementation and Decision Making

Similar to other natural resources in Tonga, Coastal and Marine Resources management is fragmented among several government agencies. Agencies that have responsibilities and roles to play in the coastal areas and resources are the Ports Authority; Ministry of Lands, Survey and Natural Resources; Ministry of Marine and Ports; Ministry of Fisheries; Ministry of Agriculture and Forestry (Forestry Division); Ministry of Works; Department of Environment; and Tonga Visitors Bureau (Tourist Facilities).

Decision making and implementation is also fragmented and lacks concerted effort and coordination. The control, development and management of the fisheries resources in Tonga are the responsibility of the Ministry of Fisheries. However, the Ministry of Lands, Survey and Natural Resources coordinates policy making regarding land, coastal area, sea beds (according to the definition of “land” in the Land Act) and natural resources while the newly established Department of Environment take care of all environmental issues such as policy, management, etc, formulation and implementation.

2.2 Legislative and Policy Platforms

- **Royal Proclamation 1887**
The proclamation defines the extent and boundaries of the Kingdom of Tonga within the latitudes 15°S and 23.5 °S and longitudes 173°W and 177°W from the Meridian of Greenwich.
- **Royal Proclamation 1972**
The proclamation defines the islands of Teleki Tokelau (North Minerva Reef) and Teleki Tonga (South Minerva Reef) and all islands, rocks reefs, foreshores and waters lying within a radius of twelve miles thereof as part of the Kingdom of Tonga.
- **Territorial Sea and Exclusive Economic Zone Act 1978**
This act is not in force. But if it were, it would establish a twelve nautical mile territorial sea and a 200 nautical mile exclusive economic zone. The total area of the EEZ would be about 700,000km² as compare to approximately 400,000 km² covered by the Royal Proclamation 1887.
- **The Fisheries Act 1989**
The basic fisheries law in Tonga is the Fisheries Act 1989. The Act provides for the management and development of Fisheries and other matters incidental thereto and repeals Fisheries Regulation Act, 1923, the Fisheries Protection Act, 1973, and the Whaling Industry Act, 1935.
- **Fisheries Regulations:** Three sets of Fisheries Regulations are:
 - The Fisheries (Conservation and Management) Regulations
 - The Fisheries (Foreign Fishing) Regulations
 - The Fisheries (Local Fishing) Regulations
- **USA multi-lateral treaty with FFA member countries.**
 - Tuna treaty of FFA member countries with US for Tuna fishing

2.3 Cooperation & Participation

With regarding to Marine Fisheries Resources, certain associations and network have been established:

- **Tonga Export Fisheries Association**
With enormous support from the Ministry of Fisheries this association is mainly made up of private sector agencies who are involved in exporting marine resources to overseas market.
- **Pearl Farmer Association**
To accelerate the commercialization of pearl farming in a more cohesive manner.

- **Women in Fisheries Network**
To widen the perspective of the involvement of women in the community will help to manage the resources. Through the Extension Section of the Ministry of Fisheries there were several activities directed towards the grass root level of the community, schools and to the general public. This is to increase understanding about our environment and the sustainable utilisation of the resources.
- **Enforcement of Fisheries Regulation**
Ministry of Fisheries working together with the Police Department is carrying out any prosecution cases.
- **Under Hazard Analysis Critical Control Point (HACCP)**
MoF and MoH are cooperating in certifying certain areas that are suitable seafood outlet/plant.
MoF and MLCI are working closely in approving and issuing of development licenses related to marine enterprises.

In addition to direct Japanese assistance, Tonga and other Pacific island countries receive aquaculture support from the South Pacific Regional Aquaculture Development Programme (SPRADP), which is executed by the FAO and financed by Japanese trust fund.

3. CAPACITY BUILDING

3.1 Education and Training

- **Seed Production and Sustainable use of coral reef Resources.**
Ongoing regional training host conducted by JICA/MoF .
- **Fish Handling and processing**
Hosted and conducted by MoF, supported by an overseas fund. Participants are from private sectors and NGOs.
- **Outboard engine maintenance**
Hosted by MoF with cooperation of Training Section (PM Office). This is open to the public and local fishermen to assist in maintaining their outboard motor.
- **Fisheries Extension Officer Training**
SPC hosts and funds this ongoing training. Aim is training Fisheries Officers to work in the outer island and rural areas.
- **Inshore Fisheries Resources Management**
Ongoing training in Japan hosted by JICA.
- **Reef Enhancement**
Releasing of giant clam, trochus, green snail for reef enhancement purposes.

JICA has provided aquaculture experts, training, materials and operating support to Tonga through in-kind technical assistance programmes.

3.2 Communication and Awareness

- Promote and increase public awareness of the activities and responsibilities of the Ministry of Fisheries, through creation of documents and presentations.
- Storage of important information such as documentaries and allow for easy access and sharing information.

4. NEEDS & CONSTRAINTS

- There is also a need to strengthen the extension work and outreach programmes in the community level of the Ministry of Fisheries;
- There is a need for new legislations to replace outdated ones;
- Lack of public awareness programmes exist;
- Lack of local technical expertise;
- Lack of financial resources leaves Tonga with no funds to implement; and

- Shortage and lack of inappropriate technical equipment.

Civil Society Organisations reported the following needs and constraints in the sector of "Coastal and Marine Resources":

- Lack of understanding by resource users;
- Poor sense of ownership from resource users;
- Limited rural (particularly outer-island) access to channels for dissemination of information;
- The open access nature of coastal resources causes lack of community control over coastal land, which does not encourage a long term relationship with the resources;
- This type of training are mostly done in Tongatapu and Ha'apai only;
- Geographic outreach of project limited because of available resources;
- Lack of cooperation between relevant sectors/actors/communities; and
- Limited project resource.

Chapter 5: Freshwater Resources

Context

Water, like land, is not only precious, but is a limited resource in Tonga. Tonga does not have surface water apart from a few salty lakes on the islands of Tofua, and Niuafu'ou. The main source of water is from rainwater collection or from a thin fresh water lens within highly porous limestone substrate. The volcanic island of 'Eua gets its water from caves high above sea level. A large number of small islands in Ha'apai and Vava'u rely entirely on rainwater tanks for their water.

According to the 1996 Census, out of the total 16,194 households in Tonga, 84.6% (13,705 households) had access to piped water supply. It is common for a household to have access to more than one source of water supply. For example, a household may have access to piped water as well as have its own water tank (Stats Dept 1999). The 1996 Census also showed that 58.3% (9,444 households) had their own water tank; 2.4% (393 households) had their own well, and 1.1% (175 households) had other sources of water supply.

Water consumption per household per month, in the Greater Nuku'alofa area was estimated at 0.03 ML in 1998. These are only the households that have water meter. For the same year, in Nuku'alofa, it was estimated that 9.06 ML of water was for non-domestic uses; a total average of 87.67 ML was for domestic uses; and 70.45 ML was unaccounted for (Water Board Data Base). The non-domestic water uses were mainly from the Small Industries Centre and from the service industry such as hotels and motels, and service stations. Water for agricultural purposes was not recorded.

The projected water requirement for the Nuku'alofa area is given in (Table 2).

Table 2: Projected Average Daily Water Production Requirements
(Units=ML/d otherwise stated)

Year	1996	1998	2001	2011
Nuku'alofa Area Population (based on 0.3% annual growth rate)	29,509	29,686	29,295	30,865
Population served (d)	26,558	26,717	26,959	27,779
Consumption per capita (l/c/d)	120	140	150	180
Domestic demand	3.07	3.04	4.04	5.00
Non-domestic demand	0.17	0.16	0.20	0.25
Total demand	3.24	3.20	4.24	5.25
Unaccounted for water	2.50	3.63	1.36	1.30
(%)	0.44	0.53	0.24	0.20
Total Consumption	5.74	6.83	5.60	6.55

Source: Tonga Water Board (2000) Data Base

The growth of the capital towns such as Nuku'alofa, Neiafu and Pangai will undoubtedly have great impacts on water availability and quality. As the natural recharge of aquifers is controlled by climatic changes, recent monitoring carried out by the Mineral Resources Unit of the Ministry of Lands, Survey and Natural Resources shows a situation of increasing salt concentration (using the WHO Standard for Conductivity – 1,200 μ S). Sustainable development in Tonga without adequate freshwater supply for all its needs and services represents a very bleak outlook for future generations.

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

- Hydro-geological monitoring of water quality in village water supplies at Tongatapu, Vava'u and Ha'apai on a quarterly basis by the Ministry of Lands, Survey and Natural Resources, Mineral Resources Unit;
- Borehole survey and leveling of borehole to determine accurate total depth to be drilled in relation to the estimated thickness of the water lens by the Mineral Resource Unit of the MLSNR;
- Logging of Drilling Operation carried out solely by the Mineral Resource Unit to control over drilling and the need for empirical data on landform morphology;
- A Draft Water Resource Bill is currently under consideration primarily aimed at sustainable use of the groundwater resource;
- Tonga Water Board Institutional Strengthening Project funded by AusAID covering activities such as legislative review assistance, improvement of Mataki'eua well field, leak detection work, workshop, Neiafu and 'Eua Water Supply improvement project, infiltration galleries for augmentation of freshwater in Pangai;
- Drafting of a new Tonga Water Board Bill;
- The first Tonga Water Board Corporate Plan 1997/2001 has been prepared and implemented;
- Improvement of water flow in low-pressure areas fully funded by the Water Board;
- Replacing the Water Reticulation System in Nuku'alofa which is more than 30 years old for a better and reliable water supply funded by the Government of Japan; and
- Computerising of the Tonga Water Board Billing System.

Civil Society Responses:

- Continuing series of domestic rainwater catchment projects throughout the entire Kingdom by several agencies to improve household and community water supply; and
- Training workshops of how to build and maintain household cement water tanks.

2. INSTITUTIONAL FRAMEWORK

2.1 Implementation and Decision-making

Water supplies in Tonga are managed by three distinct authorities: the Department of Public Health (Ministry of Health), The Mineral Resource Unit (Ministry of Lands, Survey and Natural Resources) and the Tonga Water Board.

The Tonga Water Board is responsible for the distribution and monitoring of wells in the 4 urban areas of Nuku'alofa, Neiafu, Pangai and 'Ohonua. The Ministry of Health is responsible for the water supplies in rural areas in conjunction with the Village Water Committees in each village. As indicated above, hydro-geological survey, borehole logging and drilling are functions of the Ministry of Lands, Survey and Natural Resources, Mineral Resource Unit.

Implementation and decision-making therefore are vested in the Water Board or the authority concerned and through their respective direct channel of communications to Cabinet and Privy Council for decision making.

2.2 Legislative and Policy Platforms

The Tonga Water Board established as a body corporate under the Water Board Act 1966 by an Order in Council. The regulations and control of water supplies are detailed in the Water Supply Regulations.

The Public Health Act 1913, as amended provides for a Medical Officer or District Officer to enter into property to inspect water collection system for sanitation purposes.

2.3 Cooperation & Participation

The Board's members have representatives of the consumers, and the Village Water Committees consists totally of village/community members. Relevant National Committees established by Cabinet, such as the National Health Committee, the Waste Management Committee, the National Environment Committee, and the Development Coordination Committee, all have roles to play in water resources management.

WHO, FAO, SPC, SPREP, UNDP, ADB and bi-lateral assistance have been assisting Tonga in much needed technical and expertise training, capacity building, technical assistance and water infrastructural development for all the 3 authorities responsible for water management.

The 3 authorities are responsible for their respective community awareness programmes on water resources related issues.

3. *NEEDS & CONSTRAINTS*

- Conservation and management of groundwater and the collection and storage of rainwater are critical to sustaining people's settlement in Tonga;
- Coordination and refocusing of aid programmes and project design is needed to assist Tonga to develop water management capacity and to implement projects to improve the sustainability of water supply and usage;
- Outdated legislation and the slowness in the process of enacting of relevant legislation;
- Lack of institutional capacity and vagueness of institutional roles;
- Need for transfer of appropriate and affordable technology to investigate the viability of alternative sources of portable water such as desalination;
- The need for ongoing and appropriate water resources awareness and conservation programmes;
- There is a need for specialised training in the areas of monitoring and engineering;
- There is a need to upgrade water testing facilities and laboratories as well as related training for technicians;
- Local contribution of materials/resources not always available;
- Lengthy time waiting for projects approval from donors; and
- Insufficient funding to assist all interested families.

Chapter 6: Tourism Resources

Context

The tourism sector continues to be an important part of the Tongan economy as it generates foreign exchange earnings and to benefits from tourism should be distributed equitably throughout the Kingdom. Over the last 5 years, the growth in the receipt from tourism has been fairly stable in terms of visitors and foreign earnings. Table 3 below outlines the growth in the number of tourists coming to Tonga between 1996 and 2000. The trend has been that more and more tourists are arriving by air rather than by cruise liners and yachts because of improved air services to Tonga.

Table 3: Foreign Visitor Arrivals 1998-2000

<i>Year</i>	<i>Number of Visitors</i>
1996	40,153
1997	36,244
1998	45,814
1999	50,419
2000	48,460

(Source: Tonga Visitors Bureau, 2001)

The total foreign exchange earnings from tourism in the last 5 years are shown in Table 4. To attract more visitors and increase foreign earnings, there is a need now to:

- develop new eco-tourism products;
- introduce minimum standards to improve tourism services and products; and
- coordinate the development of tourism as a major sector.

As such, and given the present circumstances and future prospects in the tourism industry worldwide, it is expected that tourist numbers and foreign exchange earnings for Tonga will grow steadily in the next five years.

Table 4: Foreign Exchange Earnings From Tourism

<i>Year</i>	<i>Earning (Tongan Pa'anga)</i>
1996	\$15.9million
1997	\$15.8million
1998	\$12.3million
1999	\$14.4million
2000	\$14.0million

(Source: National Reserve Bank, 2001)

While tourism development in the last five years contributes to the country's overall foreign exchange earnings through creating and developing marketable products and services, it also:

- creates employment across the informal sector from demand for handicrafts and fishing and farming produce;
- creates employment in the formal sector in accommodation, restaurants, travel agents and tour operators; and
- distributes widely the economic benefits as it generates demand for other services and products as inputs, resources and peripheral services from the private sector such as transport services, retailers and wholesalers, and professional and technical services.

A general change in the attitude and taste of Tonga's tourist markets generates a demand for products that are environmental friendly: a cleaner environment and natural sceneries, to observe wildlife and appreciate the beauty of the marine environment. For tourism purposes, there is an emphasis now in Tonga on:

- developing national parks;
- beautifying natural sceneries, natural heritage sites and public areas;
- developing marine-based activities such as deep sea diving, snorkeling and whale watching and conservation of wildlife in certain areas of Tonga; and
- developing island resorts that are situated in natural settings that are in harmony with nature.

However, as there is also a need to focus on culture-based activities and products such as carving, traditional dances and handicrafts, natural resources used in creating products and maintaining cultural activities such as these can be severely affected. These include rare and endangered species of indigenous plants, corals, flora and fauna.

1. ACTIVITIES AND PROGRESS

1.1. Programmes and Projects

Eco-tourism activities in Tonga take into account and carefully consider the natural resources that the tourism activity is based upon. A number of tourism development activities are now put in place to enhance the natural environment for tourism purposes. The activities cover both the terrestrial and marine environment.

- **Beautification and Cleaning Up**
In 1998 the Tonga Government mandated a National Beautification Committee, with the Minister Responsible for Tourism as chairman, to encourage, work with and provide support to the community on the beautification of Tonga. Under this National Beautification Committee, two other committees were set up, the Nuku'alofa Township Beautification Committee for the beautification of the capital town of Nuku'alofa and the Neiafu Beautification Committee for the beautification of the town of Neiafu in the Vava'u group of islands. Activities for this programme have been funded by AusAID. Activities include upgrading of public areas in Nuku'alofa and Neiafu such as improving terraces and park areas. AusAID has also co-sponsored clean-up competition among villages in Tongatapu and Vava'u.
- **Eco-Tourism Development Project**
Eco-tourism is also now a major focus of tourism development in Tonga. The New Zealand Government now supports an eco-tourism project that covers the 'Eua and Vava'u groups in Tonga. The project covers the following with respect to the environment:
 - to prepare guided sightseeing tours for 'Eua National Park and Mt Talau National Park in Vava'u, in consultation with the Department of Environment, the Ministry of Lands, Survey and Natural Resources and the Forestry Department.
 - to locate inland caves in 'Eua for cave exploration, in consultation with the Ministry of Lands, Survey & Natural Resources and the 'Eua Community.
 - to develop whale watching as a tourist attraction in 'Eua, and form an association with whale watching operators association in Vava'u, in conjunction with the SPREP, Whales Alive and the Department of Environment.
 - to place mooring buoys for protection of reefs from destruction by yachts and other vessels mooring around the offshore islands of the Vava'u group, and placement of FADs to attract fish for game fishing, in conjunction with the Ministry of Fisheries and the Tonga International Game Fishing Association (TIGFA).
 - to prepare the islands of Maninita, Loli and Taula in the Vava'u group as protected areas for sea birds and indigenous plants so that they could be visited by interested tourists.
- **Codes of Practice**
The TVB in conjunction with the MoF has introduced guidelines and codes of practice for whale watching operators. Furthermore, TVB in conjunction with DoE has introduced code of practice for diving and snorkeling operators, requiring them to comply with regulations and approved practices.

A new requirement is now in place demanding that all operators dealing with marine-based activities must consult the DoE and to seek their recommendations, especially for diving and snorkeling. This is to ensure that operators are aware of existing regulations and guidelines and marine protected areas.

2. *INSTITUTIONAL FRAMEWORK*

2.1 Implementation and Decision Making

TVB recognises the importance eco-tourism. It is adding value and variety to the existing range of products currently offered in Tonga to tourists. There is great opportunity in further developing eco-tourism in Tonga as it has terrestrial and marine resources for the purpose. Eco-tourism in Tonga has the potential to appeal to a larger market provided that it is properly coordinated and developed.

However, the greatest challenge is to make sure that eco-tourism development activities are undertaken in a way that does not conflict with the need to protect and preserve the environment. This involves continuous dialogue and coordination with relevant government agencies (such as the DoE, and the MoF, the MLSNR which regulate and have mandates for specific aspects of the eco-tourism industry, the community and the TVB, which is the National Tourism Organisation.

2.2 Legislative and Policy Platforms

The meeting of the Council of Tourism Ministers of the South Pacific in Tonga in March 2001 endorsed the recommendation from the Board of the South Pacific Tourism Organisation (SPTO) for setting up a Regional Eco-tourism Council. Tonga is a member of the SPTO and therefore is committed to the implementation of the resolutions of the Council of Tourism Ministers. Recently, in October 2001 Tonga participated in a SPTO organised seminar on Eco-Tourism and Sustainable Development. This is a first step toward regional dialogue on eco-tourism in the South Pacific, which will assist in the process of setting up the Regional Eco-tourism Council.

Under the Tourist Act of 1976, the Minister Responsible for Tourism is empowered to make the appropriate tourism policy and regulations. The Minister has prescribed minimum standards, at present covering accommodation facilities but eventually covering other services in the tourism industry. The Minister also approved the introduction of new guidelines for licensing businesses in the tourism industry. Part of the guidelines requires the recommendation from the Department of Environment on projects and proposals from businesses likely to have impact on the environment especially marine-based activities. While the 7th National Strategic Development Plan covers strategies both for sustainable environment as well as sustainable tourism development, a 'whole of government' plan has been introduced by the Tonga Visitors Bureau to better integrate tourism development with other related areas including the environment.

2.3 Cooperation & Participation

In order for better cooperation and participation to ensure sustainability in tourism development there is a need for the Tonga Visitors Bureau to:

- be given proper technical advice and guidelines through consultation with the relevant government agencies to integrate their activities and address common concerns;
- work together with relevant government agencies and coordinating the need to protect and preserve the environment and at the same time develop specific features of the environment for tourism purposes;
- ensure that the public are made aware of the need to protect and preserve the environment and how tourism could benefit from such as an effort; and
- collaborate with civil society organisations have also been active in promoting beautification competition in villages throughout the islands of Tonga involving women's and youth groups.

3. CAPACITY BUILDING

3.1 Education and Training

The Community Development Training Centre, Ministry of Education is running an 18-month certificate level course in tourism. The syllabus covers marketing and promotion, tourism development, eco-tourism and hospitality. The 'Ahopanilolo Technical College also runs training courses in tourism covering essentially the same areas.

Beginning in 2002, the Tonga Visitors Bureau will co-host with relevant Government agencies such as the Ministry of Health, Fire Department, Department of Environment, Ministry of Fisheries and Ministry of Marine and Ports, a series of short-term training activities.

3.2 Communication and Awareness

Programmes currently running are as follows:

- A weekly radio program in the Tongan language hosts by the Tonga Visitors Bureau targets the tourism industry and the general public broadcasting information on tourism development activities;
- Beautification competition involves inter-village inspection visits encouraged and sponsored by both Government Agencies and NGOs;
- NGOs also funds drama competitions and visits of drama group to schools and communities with Tonga Visitors Bureau visiting to primary schools and colleges on a clean-up awareness campaign; and
- Aid donor supports efforts to plan a clean-up awareness campaign in collaboration with Government, NGOs, aid donors and the private sector.

4. NEEDS & CONSTRAINTS

There is a need to:

- strengthen working relationships between tourism industry, Tonga Visitors Bureau and other appropriate government agencies;
- effectively police and control the activities of the tourism industry to make sure that codes of practice and guidelines are effective tools for sustainable eco-tourism development;
- put in place the capacity for better focus and coordination in tourism development through coordination committees and task forces to designing strategies and long-term plans for eco-tourism development in Tonga;
- expand technical and financial assistance for eco-tourism development in future;
- have a regional body to focus on eco-tourism development in the South Pacific;
- for aid donors to recognise the value of eco-tourism in Pacific island countries and integrate this into their policies and strategies on bilateral and multilateral aid; and
- link together the efforts, strategies and policies of all Pacific Island countries as well as those of regional bodies and aid donors.

Chapter 7: Transport and Communications

Context

The general objective for the Transportation and Communication Sectors for Tonga over this decade focused on the coordination and rationalisation with regards to policy issues, planning, management, operations and maintenance.

Transportation in Tonga is managed under three different bodies namely M.O.W (for land), M.M. P (for sea), and the M.C.A (for air transport). However, there is no overall coordination of the transport sector and there is yet to be a transport policy for Tonga.

Land transport in Tonga has been very challenging as opposed to the limited land resource. As a result, the total length of road networks cannot be increased because of the existing land tenure system where the land has been subdivided. As such, the objective of road transport at present is the issue of maintenance and thus, to move towards a more sustainable method for road maintenance and rehabilitation. In addition, the bulk of the existing road network was constructed from aid resources and these resources will not continue to assist this sector. Thus, it has been very critical for the government to move forward and manage its physical infrastructure in a more sustainable manner.

The Marine Transport Sector involves domestic and international services. Domestic inter-island transport operate between different groups of island, as well as international services being offered. The administrative structure of the marine transport sector has changed over the early 1990s through the division of responsibilities between the Prime Minister (M.M.P) and the Minister of Finance (Controller of Customs). Accordingly, functions have been reorganised between the M.M.P and the Ports Authority in 1998 according to the Ports Authority Act. Adequate safety standards and certification norms for Tongan vessels and crews have been established and are enforced by the M.M.P. However, there may be other acts and regulations in this sector that needs firmer enforcement to adequately assist the development of the sector. In addition, this will assist Tonga's support for international treaties/conventions in the sector.

The M.C.A is responsible for the regulation of air transport services in Tonga. This includes the operation and maintenance of six airports, including fire and security services, air traffic services, navigation and meteorological services. The M.C.A has been challenged for improvement in its administration of its Civil Aviation responsibilities including its role in the Royal Tonga Airlines, and ascertaining Civil Aviation capacity is in line with international standards.

Today, in Tonga, it is important to recognise that telecommunications also play an essential role in alleviating the isolation of the small and scattered island group, and in the strengthening the link with the rest of the world. The impact reaches many economic and social aspects whereby Tonga has tried to benefit from.

Over the past decade, Tonga had been fortunate to receive some infrastructure programmes that it had invested interest in, to reflect the national importance of the sector to the country. Part of these included road construction projects, development work on airports and wharves, and some administrative strengthening in the responsible Ministries. To reflect the importance of the Transport and Communications sector, government has made it one of its priority areas in its current and previous Strategic Development Plans, to focus on these areas with policy guidelines land strategic result areas.

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

Transportation

- **Infrastructure Development Programme**
Implemented by the M.O.W and funded by AusAID. The project placed emphasis on training, institutional development and the introduction of management information systems.

- **Road Improvement in Tongatapu**
A comprehensive road network system and most parts of Tonga can now be accessed by road especially with aid funding from Japan, Australia and New Zealand.
- **Road Policy & Policies Guideline for Public roads & Rights of way**
Cabinet approved in 1996 guidelines for roadwork and established a National Road Committee under the MLSNR to look over the matters relating to road works and charge appropriate fees. Committee membership includes MLSNR, MoW, TEPB, TCC. In the same year, Cabinet directed that roads must be returned to original state after road cuts for utility purpose in the main commercial areas of Nuku'alofa, Neiafu, and Pangai. The Police department's membership in the Road Committee was also an addition.
- **Transport Infrastructure Project**
The project's objective was to upgrade about 50 km of key urban and rural roads, an international berth at the main port of Nuku'alofa (Queen Salote Wharf) and the facilities at eight inter-island port sites in a cost-efficient, sustainable and prioritised manner. This project also prepared a road safety strategy and supported institutional development of the port sector.
- **Capacity Building Project for M.C.A**
Project funded by NZODA to assist the M.C.A to undertake its broad range of operations in accordance with local and international Civil Aviation regulations and standards and to plan for the upgrading of facilities and standards.
- **Ha'apai Airport Upgrade**
Enhanced aviation safety and upgraded tourist facilities is the major benefit of this project.
- **Renovation of Ha'apai Wharf and Ha'ano Jetty**
Financial assistance from AusAID. These two projects make significant contributions to inter-island transport between Ha'apai and the rest of Tonga.
- **Open Register of Ships Project**
A Greek company has been contracted to assist Tonga in this project. This Registry is geared for international ship owners who wish to operate under Tongan law and protection.

Communication

- **Telecommunications Unit**
Established in the Prime Minister's Office (PMO) to provide regulatory services for telecommunications, radio and television broadcasting; provide policy advise on telecommunications matters and; to provide policy and direction on the Government's satellite project.
- **Information Technology Strategic Plan**
Funded by AusAID. Aimed at providing a statement of the IT Strategies and priorities for the Civil Service. As a result, the Government Computer Committee (GCC) was formed to coordinate all computer needs/issues for Government.
- **Establishment of an internet service provider**
Stationed at the Cable and Wireless. Now run by the TCC.
- **Establishment of Tonga Communications Corporation**
TCC now have total control over local and all international communications.

2. *INSTITUTIONAL FRAMEWORK*

2.1 Implementation and Decision Making

International Maritime Organisation (IMO) Conventions that Tonga has acceded to are as follows:

- IMO Convention 48;
- IMO Amendments 93;
- SOLAS (Safety of Life at Sea) Convention 74;
- SOLAS Protocol 88;
- LOAD LINES Convention 66;
- LOAD LINES Protocol 88;
- TONNAGE Convention 69;
- COLREG (International Regulations for Preventing Collisions at Sea) Convention 72;
- STCW (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers) Convention 78;
- MARPOL (International Convention for the Prevention of Pollution from Ships) 73/78;
- Intervention Convention 69;
- Intervention Protocol 73;
- CLC (International Convention on Civil Liability for Oil Pollution Damage) Convention 69;
- CLC Protocol 92;
- FUND International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage) Protocol 92;
- PAL Athens Convention relating to the Carriage of Passengers and their Luggage by Sea) Convention 74; and
- OPRC (International Convention on Oil Pollution Preparedness, Response and Co-operation) Convention 90.

Civil Aviation Conventions that Tonga adheres to are as follows:

- Convention on International Civil Aviation;
- Protocol on Authentic Trilingual Text of the Convention on International Civil Aviation;
- Convention on the Unification on Certain Rules relating to International Carriage by Air (Warsaw);
- Hague Protocol;
- Convention on the Suppression on Unlawful Seizure of Aircraft;
- Convention on the Suppression of Unlawful Acts against the Safety of Civil Aviation;
- Convention on the Privileges and Immunities of the Specialised Agencies; and
- Mobile Equipment Convention and Aircraft Protocol.

Transportation

Transport in Tonga is managed under three categories: land, sea and air.

- Land transport is the responsibility of the Ministry of Works (to construct and maintain roads) and the Ministry of Police (responsible for road signs and markings plus road safety issues);
- Sea transport is the responsibility of the Ministry of Marine & Ports who is responsible for safety at sea; and
- Air transport is the responsibility of the Ministry of Civil Aviation.

Communication

Communication is the responsibility of the Telecommunications Unit in the PMO. This encompasses telephone system usage, radio broadcasting, television broadcasting and internet services.

National decision-making is only made by public officials. Once these decisions are made, then the wider public is informed and awareness campaigns are implemented.

Government owns and operates the infrastructure in Tonga. However, the private sector is involved only when government is unable to provide adequate infrastructure, thus the private sector provides a subsidy in particular road construction, enabling government to provide required infrastructure. Once transport infrastructure is built, government is responsible for its maintenance where possible.

2.2 Legislative and Policy Platform

Transport

These laws have not been modified since the Rio Summit to reflect issues highlighted there. These are as follows:

- Land transport is governed by Traffic Act Cap 156 (Amendments Act in 91 and 97), Bicycle Registration Act Cap 157, Roads Act Cap 155;
- Sea transport is governed by Shipping Act Cap 136 (Shipping Amended Act 99), Carriage of Goods by Sea Act Cap 141, Carriage of passengers by luggage by Sea Act Cap 142, Harbours Act Cap 137 (Amendments 92, 94, 987), Wharfs Act Cap 138 (Amendment 92, 94, 97 and 98), Dock Regulations Act Cap 140 (Amendments 92), Shipping (Limitation of Liability Act) Cap 143, Marine Insurance Act Cap 144 Ports Authority Act 1998; and
- Air transport is governed by Civil Aviation Act Cap 151, Aerodomes Act Cap 152, Aircraft Offences Act Cap 153, Carriage by Air Act 1991.

Communication

Communication is governed by the Telephone Act Cap 97, Telegraph Act Cap 99, Radio communication Act Cap 98 and the Broadcasting Commission Act Cap 100.

Tonga's current three year rolling Strategic Development Plan (2001 –2003) pursues nine objectives of which two are focusing on infrastructure. These two objectives target an efficient, well-structured state owned enterprises (public utilities); and well maintained physical infrastructure. These objectives are further promoted by policy guidelines for the areas of *Maintaining and Improving Physical Infrastructure* and the *Development of Communication and Information Technology*.

2.3 Cooperation & Participation

To further support the strategies for supporting the Transport and Communication Sector, initiatives have been proposed for donor assistance.

It can be seen now that there is consultation between government and civil society on several matters before decision-making. In other cases, villages are also able to participate in decision making if road or access to a village needs improving, the villagers themselves will raise the bulk of funds required to undertake the work land request only for government subsidy.

3. CAPACITY-BUILDING

3.1 Education and Training

- As part of the capacity building mechanisms for transportation and communication, Tonga has managed to send participants to participate locally in workshops/training courses or in international courses overseas at institutes conducting ideal courses. These have managed to improve and increase the awareness of locals in the area and enable them to widen their area of expertise.

3.2 Communication and Awareness

Environmental awareness campaigns are run to inform the public on specific issues. The impact of transport on the environment is not one of the more pressing environmental concerns facing Tonga today. Due to its low priority, this is a topic that has not been given much attention in public awareness campaigns. However, Tonga has recognised that there is a growing traffic and vehicle problem in Tonga and will address this in its next Strategic Plan.

Radio advertisements are aired on road safety issues. As well as police radio programmes that also inform the public on weekly traffic violations and accidents. These are sponsored by the Traffic Section of the MoP.

4. *NEEDS & CONSTRAINTS*

- Need for a revised long-term road construction and maintenance programme with funding commitments;
- There is lack of expertise and no financial support;
- Ill-managed transport and traffic systems;
- Require policy reform to promote cost recovery for an efficient transportation system where assets and the sectors can be maintained at a sustainable level;
- Need further improvement to outer island wharf facilities;
- Need to revise the maritime legislation covering issues such as port safety, pollution and operation;
- Lack of qualified local manpower in various aspects of the transport and communication sectors which results in using expatriate personnel; and
- Need to strengthen the Telecommunications Unit of the Prime Minister's Office to be able to carry out their tasks efficiently and effectively.

Chapter 8: Energy Resources

Context

Energy plays a crucial role in sustainable development and this relationship is high on the national and international agenda. Limited access to adequate energy services, or shortage of such services, is a barrier to Tonga's social and economic development and the alleviation of poverty. A significant portion of the population does not have access to basic electricity for lighting, and very few use LPG or kerosene for cooking. It is important for Tonga's national planners and decision-makers to be aware that energy services drive economic and social development and represents an essential bottleneck if not sufficiently available.

Tonga's indigenous energy resources are limited. There is no hydroelectric or geothermal potential. Electricity generation is diesel-based. Wave energy has been investigated but is not being pursued as an alternative. Thus Tonga's immediate available resources are its depleting wood stock, abundant coconut residues, and solar energy. Depleting wood resources are caused mainly by pressure on land for agricultural purposes. The country is increasingly reliant on imported petroleum products to satisfy its commercial energy needs. Thus it is vulnerable to external events that affect the price and availability of petroleum products and export potential and foreign currency flows from remittances and aid.

The pattern of energy use in Tonga during the decade has changed dramatically, reflecting the rapid development of energy-intensive economic activities, thus intensifying Tonga's reliance on imported petroleum products. In 1992, indigenous biomass accounted for 56% of total energy consumed, while petroleum represented the remaining 44% (of which a third was consumed by power generation). By 2001, imported petroleum products captured 54% of the total energy requirement, with biomass, for households and agricultural processing, dropping to 43%. In terms of power generation, electricity grew from 3% in 1991 to roughly 5% by the year 2000, and close to 95% of the potential residential consumers is served. Renewable energy continued to rise from less than 1% in 1990 reaching 2% by 2003.

The main characteristic of the power subsector is the high demand growth over recent years. The consolidated energy generation for the four systems grew from 24.21 GWh in 1989/90, while sales amounted to 20.01 GWh. By 2001, sales reached approximately 28.8 GWh, a 44% increase during the 10-year period. Energy losses in power transmission declined by 4% (from 13% in 1990 to 9% in 2001). Consumers were estimated at 8,000 in 1992 and 13,000 active consumers in 2001 – a 62% growth, of which 76% are residential, 7% commercial and others accounts for the balance.

In 1992 the value of petroleum import was estimated at \$3m (equal to 30% of total imported goods), and \$17m by the year 2000. The recent rising of oil in the international market as well as a growing demand in the transportation sector accounted for the steep increase in the value of fuel import. In terms of volume, an average growth rate of 12% was observed in 1990. During 1985 – 1990, imports of petroleum products increased at an average rate of 12% by volume. At least 80% of imported fuel was consumed by the transportation sector during the decade. Retail prices during the decade fluctuated in response to the external markets, when oil prices soared as high as US 45/barrel and plummeted to as low as US 5/barrel. In 1995 retail prices for gasoline was as low as TOP 59.88/litre, 64/lire for diesel, and 54.58/litre for kerosene. During the third quarter of 2001, retail prices per litre reached TOP 1.66 for diesel, 1.44 for gasoline, and 1.45 for kerosene.

The rising fuel demand also impacted on storage capacity. During the third quarter of 2001, oil storage capacity expanded by an additional 2,130 tonnes at Nuku'alofa and 70 tonnes at 'Eua.

The majority of households in rural areas cook primarily with fuelwood and coconut residues. The consumption of biomass has decreased against the growing consumption of petroleum. The purchase price of fuelwood continued to rise in Tongatapu, particularly within the Nuku'alofa area, due to observed supply limitations.

Solar energy is traditionally utilised for crop drying and food preservation. Photovoltaic (PV) technology has been used extensively to provide electricity to rural communities, primarily on outer islands that do not have grid supplier power. It is estimated that 582 PV lighting systems and a community freezer have been installed. By 2003, an

additional 170 systems will have been installed at 7 islands at the Ha'apai group and 100 at Niuafu'ou. Solar thermal application for water heating is also well developed on Tongatapu and has expanded in the residential sector and within the tourism industry.

The direct impact of energy services on the environment became visible with traffic smokes in Nuku'alofa and dumped waste oil on the grounds throughout the island group.

As commercial energy increased its share of the country's total energy requirements, energy conservation among producers and consumers responsive to energy-saving measures assumed greater importance.

Minimal development occurred in the administrative sector although the privatisation of power generation was achieved in 1998 when Shoreline took over the power generation. The institutional framework is fragmented and the overall management of the sector received low priority that resulted in a lack of focus on important energy issues, which required attention of some central authority.

To date, the primary objective of providing leadership to the sector was to contribute to a balanced approach between energy resource development and supply, on the one hand, and energy conservation, on the other. To this end, it is necessary to redefine the objectives and functions of the central energy institutions to increase the allocation of human and financial resources.

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

- **Tonga Solar Rural Electrification Program**
The introduction of solar home systems (SHS) in 1986 to outer islands funded 107 systems in Vava'u. By 2000, a total of 580 systems have been externally financed on a grant basis representing an installed peak capacity of approximately 60kw and a total investment of about T\$1.3m. This is the largest in the Pacific apart from French Polynesia and New Caledonia.
- **Fuelwood Planting**
More than 1000 fuelwood seedlings were distributed by the MLSNR in co-operation with the Ministry of Agriculture, Forestry and Fisheries. The project, funded by SPREP, aimed at replenishing depleted fuelwood stock, raise awareness regarding the link between energy sustainability and the environment.
- **National Energy Database**
A national energy database was set up through a regional program, which compiled data on energy supply and demand at the various subsectors (petroleum, electricity, transportation, and renewables). A yearbook was published, the first of its kind, and distributed locally and throughout the region. Funding was provided by the Forum Secretariat in 1996 under the regional program for establishing regional and national energy databases.
- **Power Sector Reform**
The ADB and the government of Tonga signed an agreement for a soft loan to rehabilitate the power station, improve transmission loss and strengthen the capacity of the utility during 1995 - 97. In 1998, power generation was privatised when a private company, Shoreline Ltd, took over the generation for Tongatapu and Vava'u. There are future plans for Shoreline taking over power generation at Ha'apai and 'Eua by the end of 2001.
- **Energy Conservation Awareness Raising**
Various energy conservation activities directed the attention of thousands of energy consumers to the numerous issues concerning energy efficiency (in terms of fuel conversion, production and distribution, and application), economic implications and the environment impacts of energy application. The NZODA financial assistance funded annual radio programs in the local language, thousands of distributed pamphlets, workshops, lectures, and competitions targeted consumers & end users, operators & caretakers,

policy makers, managers, planners, drivers, youth leaders, women groups and school children. In addition, funds allocated by the EU Pacific Regional Energy Program and SOPAC enabled the design of energy curriculum for secondary school to raise children's awareness about energy resources and sustainable development. Teacher guides and students activity booklets will be ready for distribution by 2002.

Workshops in Tongatapu, Vava'u and Ha'apai taught drivers about driving techniques that result in fuel efficiency. Funds were available from NZODA and UNDP.

- **Demand Side Management in the Power Subsector**

A demand side management program promoted energy efficiency through power subsector development, specifically in load management & projections, rehabilitation, and capacity building, and transmission. A reduction of energy losses from 13% down to 9% in power transmission was achieved. ABD granted Tonga funds through a soft loan arrangement.

The public awareness of DSM program was funded by NZODA and activities included workshops for youths, mechanical/technical operators, women and school children. Radio programs ran parallel to the training program.

- **Energy Standards & Labeling Program**

Petroleum safety and standards training were introduced in 1994, as guidance for oil companies and users of petroleum products, to conform closely to regional and international safety standards in terms of energy conversion, production, transportation, transmission, distribution and application. The program was funded by the Forum Secretariat under UNDP assistance to the energy sector.

2. *INSTITUTIONAL FRAMEWORK*

2.1 *Implementation and Decision-making*

The institutional framework for the energy sector is fragmented. MLSNR has overall responsibility for energy related matters. An inter-ministerial body, the National Standing Committee for Energy (NSCE), was established in 1979 to report to Cabinet on energy matters and to formulate national energy policy, but the committee has not met since 1997. MLSNR provides the secretariat for the NSCE.

The EPU was established within the MLSNR in 1983 and is mainly involved in the implementation of solar energy projects, public awareness campaigns on renewable energies and conservation, and other tasks related to petroleum subsector. MLSNR also has a Geology Section, which co-ordinates petroleum exploration.

Several other Government bodies and the private sector are involved in energy and energy-related matters. The TEPB is a wholly government owned entity initially vested with the sole authority to generate and distribute electricity in the country. However, generation was privatised when Shoreline was granted a permit to generate electricity in 1998.

The Competent Authority (CA) of the MLCI controls wholesale and retail petroleum prices, while the MoFin assesses and collects duties on petroleum products.

MAF and Fisheries is responsible for forest resource development, which includes the improvement of fuelwood supply through the distribution, in co-operation with MLSNR, of seedlings of fuelwood specs.

In terms of energy project co-ordination, the Central Planning Department in the Prime Minister's Office co-ordinates the government project cycles, including evaluation and presentation to Cabinets of energy projects submitted by line ministries. The Ministry of Foreign Affairs co-ordinates requests for external assistance for capital expenditure projects and technical assistance programs.

The private sector plays an active role. Private oil companies (British Petroleum, Shell and Tri-Star)⁶ are responsible for the import, storage, domestic distribution and retailing of petroleum fuels. MoW handles the procurement of petroleum from the oil companies for the government use. Small electrical importers and electrical contractors have maintained their essential roles in the energy market.

This division of energy related responsibilities among the various agencies are justified. However, overall co-ordination must be given close attention.

2.2 Legislative and Policy Platform

As indicated in the preceding section, various legislations under diverse authority addresses legal energy matters thus highlighting the need for a centralised authority and a binding legislation. To date there is no Energy Legislation although a Draft Bill was drafted under ESCAP assistance in 1994. A review of this draft bill is due if sectoral progress is desired and tangible results are witnessed.

Existing legislations include the Petroleum Mining Act and Petroleum Act which provide permits for explorations while fuel prices are controlled by the Price & Wage Control Act. The TEPB Act regulates power generation, distribution and standards and amendments were made recently to facilitate the privatisation of the power generation. The Agriculture & Forestry Act contains provision for biomass supply and conservation measures.

In terms of a coherent and comprehensive national energy, no policy document exists as yet. Approaches to policy formulation in the past have been ad hoc although the National Strategic Plan stipulated that sustainable development of natural resource (under which energy resources are considered) remains a priority.

2.3 Cooperation and Participation

Managing the sector was achieved through active participation and co-operation between all concerned in the public and private sectors, including the local and regional communities. Without such efforts little progress would have been visible during the reporting period.

A significant number of energy projects encouraged partnerships between formal institutions and local communities to ensure that projects were sustainable. Quite often communities were involved in energy projects from conception to evaluation. Such approach further strengthened the links between decision-makers and recipients of energy projects, highlighted that energy developments do not exist in a vacuum, and the key to sustainable energy development is co-operation.

3. CAPACITY BUILDING

3.1 Education and Training

Education and training are essential elements of national energy management programs at the public and private sectors and community levels. Capacity building during the reporting period has focused primarily at strengthening national institutions responsible for energy planning and management by upgrading managerial and technical staffs' skills necessary for effective and efficient energy management. Key focus areas include: formal academic programs (short/long term) at reputable institutions abroad for managerial and technical staffs of the national key institutions (MLSNR, MLCI, TEPB, CPD, & MOW) whereby first or second degree is obtained; training attachments & on the job training with local and multinational institutions in and outside the region; community workshops on prevalent issues.

About forty-two training and workshops, an annual average of four involved more than three thousand and forty people from all walks of life. Additional training, education, and capacity building also took various forms, specifically awareness raising mainly through annual radio & TV programs, the distribution of more than 1000's of pamphlets, posters and stickers, school competitions.

⁶ Previous companies involved in the supply side included Tonga Pacific Ltd.

4. *NEEDS & CONSTRAINTS*

- Limited domestic financial resources tend to severely under-budget operating and maintenance expenses;
- Shortage of managerial and technical skills constrains Tonga's capacity to devise sound energy policies, monitor its implementation, and operate complex energy schemes;
- Small and dispersed markets increases the cost of power generation and distribution and the supply of petroleum products; and create problems in establishing institutional arrangement to provide adequate maintenance and support services, whether for grid connected supplied electricity or for photovoltaic installations in the outer islands;
- Need to given higher priority to train nationals in energy planning and project assessments, complemented by external expertise in staff or line functions of the energy institutions;
- Need to restrict energy options to those that are proven technologically and economically similar to Tonga and which can have a significant impact on the local energy situation;
- Need to focus on energy alternatives and technologies that are robust and require minimum maintenance; and
- Need to emphasise proper management of existing alternatives and resources and avoid spreading limited institutional and technical capacity more thinly than necessary.

Chapter 9: Climate Change

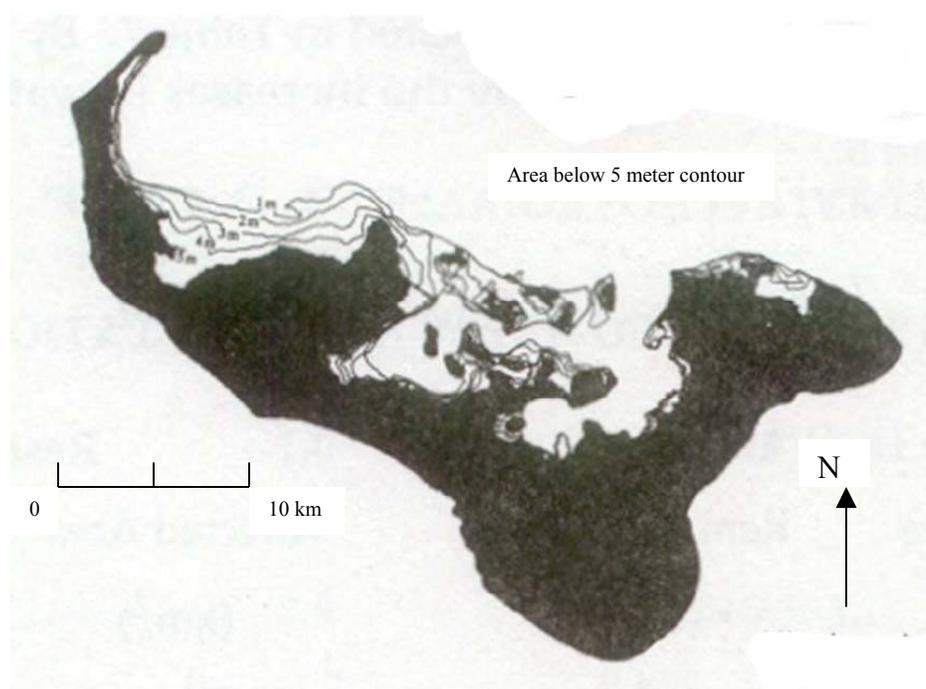
Context

Tonga is facing severe impacts due to its geo-physical, ecological and socio-economic characteristics. Climate changes and related physical changes induced by global warming are not limited to sea-level rise. In Tonga, for example, the changes in the intensity and frequency of cyclones, its associated storm surges and prolonged drought periods have considerable adverse impacts as well.

Direct inundation will be a significant problem not only in the lower parts of the larger, higher islands in Tonga but particularly in the low lying islands in the Ha'apai group. Nuku'alofa, and the northern part of Tongatapu – especially the Lagoon Watershed – is the most vulnerable area to climate change. The Lagoon System covers an area of about 27 km², one tenth of the total area of Tongatapu, and slopes from a range of 20 m above sea-level to below sea-level.

Tongatapu's vulnerability to sea level rise was assessed, using the predicted IPCC (Intergovernmental Panel of Climate Change) sea level rise scenarios of a 0.3 m or 1.0 m sea level rise by 2100. Areas up to 5 m above sea level (Figure 2) will be affected. Between 37.0% to 46.6% of the total population and 10.6% to 14.1% of the total land area of Tongatapu will be inundated (Hori, Mimura and Prescott, 1992). Nuku'alofa's elevation is particularly low, as a result, the whole of Nuku'alofa could break up into islands. The associated socio-economic cost of sea level rise to Tonga will be very devastating.

Figure 2: Areas to be affected by sea level rise



Source: IPCC, 1992

In the larger islands, water is obtained from a freshwater lens by wells. On small islands, such as in the Ha'apai groups, the freshwater lens is insufficient and people have to rely on rainwater catchments. Impacts of sea level rise in Vava'u, 'Eua and in the higher parts of Tongatapu would correspond to a rise in the freshwater lens as seawater intrudes further inland. This so-called saltwater intrusion has already ruined many wells in coastal areas, and villages in these areas have, correspondingly, had to rely on the main water system of Tongatapu and rainwater catchments for their freshwater needs. Since well depths cannot be adjusted, the life of wells not already ruined by saltwater will be lessened as the ocean level continues to rise, pushing the freshwater lens higher than the mouth of

the well. Along the broad coastal fringe of Niuatoputapu, freshwater flooding will likely occur as the dome-shaped lens stand higher than mean sea-level. In such places, greater mixing of fresh and saline water may reduce the volume of potable fresh water resources.

It is probable that coral reefs in Tonga will not respond favourably to rising sea level and sea-surface temperatures over the next 50-100 years. As such, their important function of protecting island shorelines will be significantly reduced as sea level rises. Impacts in Tonga are likely to include increased scour and sediment movement in lagoon and along island shorelines, which will increase the vulnerability of the latter to erosion. It will also cause more physical damage to the reefs themselves.

The impact on agricultural land consists of direct land loss by inundation and flooding. Secondary effects, such as higher moisture loading and increased salinisation in marginal areas, reduce suitability for gardening. Shortage of arable land is expected to increase due to sea-level rise and the contributing factor of population growth.

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

The following national climate change and sea level rise related projects implemented in Tonga are as follows:

- **The Australian Government-funded South Pacific Sea Level Rise Climate Monitoring Project**
A tidal gauge was installed at the Queen Salote Wharf and linked to the TOGA global network for the measurement of sea-level rise. The Ministry of Lands, Survey & Natural Resources, Department of the Environment and the Meteorological Services currently coordinates this activity.
- **UNFCCC Enabling Activities (GEF/UNDP)**
As party to the UNFCCC, Tonga is currently implementing its obligations for the UNFCCC Convention through developing of its First National Communication. The overall outputs of this enabling project are as follows:
 - Preparation of national greenhouse gas inventory;
 - Analysis of options to abate greenhouse gas emissions in Tonga;
 - Assessment of the impacts of climate change in Tonga;
 - Development of potential measures to adapt to climate change in Tonga;
 - Formulation of a national action plan to address climate change and its effects in Tonga; and
 - Preparation and subsequent submission of First National Communication to Conference of Parties (COP).

These activities are coordinated by the Department of Environment.

- **The World Meteorological Organisation (WMO)-funded, SPREP-executed Regional Meteorological Services Programme**
This project assisted the Tonga Meteorological Department in technical training and provisions for upgrading of the Meteorological office, and assistance for emergency weather information.
- **National Foreshore Protection Programmes (Bilateral funding and Government of Tonga funding)**
Accelerated coastal erosion and seawater inundation is common and has become a major threat to people's property and land in Tonga. Efforts including building of protection foreshores both in hard and soft structures are ongoing. However the efforts by the Government and communities are much slower than the pace of coastal erosion and inundation.
- **National Compliance Action Plan for the Phasing out of Ozone Depleting Substances (ODS)**
In this plan, consumption of ODS is presented and analysed, and an Action Plan has been developed which contains concrete strategies for timely phase out.

2. INSTITUTIONAL FRAMEWORK

2.1 Implementation and Decision Making

Tonga has ratified the following Convention:

- Vienna Convention;
- Montreal Protocol
 - Developed Action Plan for the phasing out of Ozone Depleting Substances (ODS); and
- Framework Convention Climate Change
 - Developed a GHG inventory and first Communication to CoP.

The Department of Environment carries out implementation and coordination for both of the above activities.

The Kingdom of Tonga has identified climate change issues as one of its priority development concerns. However, the institutional framework for climate change is segmented and in some instances very vague and confusing, due both to overlapping responsibilities among Government Agencies, and also to very old legislation – still providing the legal framework for current and emerging environmental problems – whose provisions are inadequate to address present situations.

MLSNR is responsible for all lands, and seabed. MoW is responsible for all infrastructural developments, and the MMP responsible for wharves and jetties as well as marine pollution from ships. The Meteorological Department is responsible for all weather-related forecast activities. The Department of Environment – now a separate Department but for twenty years a section under the Ministry of Lands, Survey and Natural Resources (MLSNR) – has the expertise and the experience to develop all the environment and conservation related activities of the MLSNR; but without very clear mandates as regard to the MLSNR. However, the Department of Environment has a coordination role, of national and regional activities as well as international environmental conventions that Tonga has ratified, an environmental monitoring role, and an environmental education and awareness role.

2.2 Legislative and Policy Platforms

At present, there are no laws, regulations or directives to address solely Climate Change. However the following legislations have provisions to address Climate Change issues:

- The Land Act of 1903 and its subsequent amendments; and
- The Parks and Reserves Act of 1976.

An EIA Bill, contains provisions for assessing the environmental impacts of nature development projects. This Bill still awaits consideration by Cabinet and Parliament.

2.3 Cooperation & Participation

Cooperation and participation in the climate change area is nationally carried out by The National Coordination Committee for Climate Change with the following members:

- Director of Environment – Chair;
- Secretary for Lands, Survey and Natural Resources;
- Director of Central Planning;
- Director of Agriculture and Forestry;
- Director of Works;
- Secretary for Marine and Ports;
- Secretary of Labour, Commerce and Industries;
- Director of Health;
- Director of Education;
- Secretary of Civil Aviation;

- Secretary for Foreign Affairs;
- Secretary for Fisheries; and
- President of the Tonga Association of Non-Government Organisation.

Tonga is also a member of the following regional and international organisations that assist Tonga in Climate Change Activities:

- All United Nation agencies, WMO, SPREP, ForSec, SPC, SOPAC;
- Participation in AOSIS negotiations and workshops;
- Participation in UNFCCC Conference of the Parties; and
- Bi-lateral arrangements with the government of Australia and Japan provide training on the area of climate change.

3. CAPACITY BUILDING

3.1 Education and Training

Most projects provide for training and capacity building. The following have been achieved:

- Sea level monitoring training conducted in cooperation with University of Flinders, and the University of South Pacific Region. Officers from the Ministry of Lands, Department of Environment and the Meteorological Department took part in this training;
- Monitoring training in water quality, coral reef identification and coverage, seagrass identification and identification and sampling techniques carried out in various locations in Tongatapu and in Vava'u. Officers from the TVB, DoE, MoW, MoH, Tonga Water Board, and MoF participated in this in-country training and received certificates;
- The establishment of an Environmental Resource Information Centre (ERIC) at the Department of Environment, which contains information on climate change; and
- The introduction of climate change issues in the local school curriculum and development related student's research projects as part of the schools internal assessment.

3.2 Communication and Awareness

- There are no fixed mechanisms whereby information is disseminated and shared at the national and international levels;
- On the national scale, the Department of Environment airs fortnightly radio programmes on various environmental issues, which also includes climate change and topics that relate indirectly to climate change
- School visit programmes;
- Community workshops and meetings; and
- Information sheets, posters and stickers are produced for distribution to the public, including newsletter articles.

4. NEEDS & CONSTRAINTS

In dealing with climate change issues in Tonga, some of the most notable constraints come from lack of coordinated and integrated management as well as limited human and financial resources including:

- lack of coordination, consultation and integration of decision-making and management;
- the need to address adaptation strategies and their urgent implementations as a matter of priority;
- lack of public knowledge and awareness about the issue and its ever-changing characteristics;
- lack of local expertise in the field;
- lack of resources for the identification and implementation of appropriate climate change programs and the monitoring and upgrading of ongoing programs and activities;
- limited land areas and resources;

- the need for human resource development;
- lack of resources for research and investment in sources of renewable energy to reduce the cost and use of imported fossil fuels (Note: Tonga's emission of GHG is very negligible); and
- lack of commitments to implement and enforce the Popua Master Plan and the Fanga'uta and Fangakakau Management Plan.

Chapter 10 Biodiversity Resources

Context

Terrestrial Biodiversity

The total land area of about 750 km² of the Tonga archipelago is habitat to its terrestrial biodiversity. The 'Eua and Mount Talau National Parks gazetted in 1992 and 1994 respectively, represent remnants of indigenous vegetation, including forests with associated fauna, cultural/traditional landmarks and the last chance to conserve this part of Tonga's natural and cultural heritage for future generations.

Forest surveys conducted in the old-growth forest of 'Eua (Drake et al., 1996), in the old-growth and regeneration forest of Vava'u (Franklin et al., 1999), in the old growth forest of the volcanic Forests of Kao and Tofua (Park & Whistler, 1998) and in the secondary forest of Tongatapu (Wiser et al., 1999), all concluded that human activities are the main threats to the remaining forests in Tonga.

As to be expected, many of the native biodiversity assets of Tonga, notably primary forest and the myriad plants, birds and other animals that are dependent on forest habitat are now confined to where the remaining forests are still to be found.

There are only about a dozen endemic plant species in Tonga (Whistler 1989), totalling approximately 3% of the flora. Of these endemic species, 4 are found in Kao and Tofua, (*Syzygium crosbyi*, *Guioa lenticifolia*, *Pneumatopteris macroptera*, and *Selaginella yunckeri*) and 8 are found in the 'Eua National Park. Kao and Tofua don't have protection status yet.

Similar to other small Pacific islands, birds are the major group of vertebrates in Tonga. There are two endemic species, the Tongan Megapod (*Megapodius pritchardii*), and the Tongan Whistler (*Pachycephala jacquiniti*). The megapod is restricted to Niuafu'ou and the whistler to Late and a few large islands in Vava'u. There is a notable lack of effort to protect birds' habitats and control introduced threats such as rats and cats and other invasive species including its spread to uninhabited islands.

Tonga has extensive seabird breeding colonies, but these are only on the remotest islands. Species such as *Sula dactylatra* and *Phaethon rubricauda* are now very rare and may disappear completely from Tonga (Rinke, 1992).

There are two indigenous mammals, the fruit bat (*Pteropus tonganus*) and the sheath-tailed bat (*Emballonura semicandata*). Reptiles are represented by 7 species of skinks, 7 species of geckos and one species of iguana. One species of gecko (*Lepidodaactylus evaensis*) is endemic to the higher parts of 'Eua, where it was discovered in 1986. The distribution of the iguana is not known. It is known for certainty in Vava'u, Tongatapu and 'Eueiki only. It may be an endangered species in Tonga.

Insects, in general, have not been studied. Only those that have adverse or beneficial effect on agriculture have been studied to some extent. Likewise, invasive species and their impacts have not been studied and documented.

Marine Biodiversity

The total EEZ of Tonga is estimated to be approximately 0.7 million km². This vast total area of Tonga represents significant marine biodiversity and resources yet to be surveyed and documented. There is a huge potential for sustainable development in the marine sector for Tonga.

However marine biodiversity in Tonga is highly vulnerable to climatic changes, natural disasters such as cyclones, storm surges, cyanophyte bacteria (*Oscillatoria sp.*) and *Acanthaster planci* plagues as well as anthropogenic pressures.

The humpback and baleen whales feed and breed in the Tongan waters from around July – October annually. Whaling is prohibited in Tonga. Sea turtles are protected during their breeding season. Turtle stock has continued to decline.

Inshore biodiversity is vast, however this is the most vulnerable and degraded habitat and resources due to easy and open access, threats from coastal and land based development and threats from natural disasters. The majority of reef fish harvested are small herbivorous fishes, such as surgeon-fish, parrot-fish, rabbit-fish, plankton and detrital feeders and predators. Pelagic resources are also vast, most notably including skipjack tuna, big-eye, yellow-fin, and albacore tuna.

There are more than 50 commonly caught invertebrates from shallow and deeper reefs and from sand habitats. 8 species of beche-de-mer are recorded by the MoF. There are 4 giant clam species found in Tonga (*Tridacna derasa*, *Tridacna gigas*, *Hippopus hippopus*, and most recently, a fourth species *Tridacna devoroo* was identified in the Ha'apai group). All four species are highly threatened (MoF, 2000).

Lobsters are also declining. The Fisheries Act, enforced by the MoF controls lobster's harvested sizes and the harvesting of breeding females.

The two species of seagrass found in the Tongatapu lagoon are the *Halodule uninervis* and *Halophila ovalis*. Most seagrasses beds surveyed are covered by epiphytes up to 73 % (TEMPP, 2000).

There are 8 mangrove species found in Tonga. The four most common species are *Rhizophora mangle*, *Rhizophora stylosa*, *Bruguiera gymnorhiza* and *Excoecaria agallocha* (ESCAP, 1990). A baseline survey of mangrove species was carried out by DoE in 1998, using 45-mangrove survey transects at 20 mangrove locations in the Fanga'uta and Fangakakau lagoons. The information show that there is, overall a high human impact on the mangroves of the lagoon (the largest mangrove stand in Tonga). The most common impacts were cutting of trees, dumping of garbage, sewage discharge, and conversion of mangrove areas to other uses (Ellison, 1999).

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

- **Establishment of the Ha'apai Conservation Area (HCA)**
The largest in the Pacific under the South Pacific Biodiversity Conservation Programme executed by SPREP. The HCA aims at sustainable biodiversity management. The lead agency for the HCA was DoE. The HCA was funded for the last 7 years from GEF and AusAID.
- **Completion of the 'Eua National Park Management Plan and partial implementation**
Lead by the DoE and MAF, and funded by NZODA.
- **Establishment of the Parks and Reserves Authority in 1997**
Provided for by the 1976 Parks and Reserves Act for the establishment, preservation and administration of Parks and Reserves.
- **A 10 year ban on beche-de-mer harvesting**
Enforcement by MoF in order for species recovery.
- **Reef restocking programme**
MoF restocking programme such as aquaculture research, shellfish culture of giant clams, green snail (*Turbo marmoratus*) and (*Turbo petholatus*), trochus, (*Trochus niloticus*).
- **Community giant clams circle**
Large adults breeding stocks are scattered in circles to enhance greater breeding success and reseed the surrounding reefs implemented by the MoF, DoE and Community/Village Committees.

- **South Pacific Initiative on Forest Genetic Resources (SPRIG) Program 1998**
A regional project in which Tonga participated with an aim to improve selected species. The project cultivated 5 ha of sandalwood (*Santalum yasi*) at the 'Eua Forest Plantation, 2 ha in Vava'u and 50,000 seedlings of different coastal species at the Tongatapu Forest Nursery. The project is coordinated by MAF.

Tonga's participation in regional and international forum for biodiversity activities arises from the CBD, that leads to relevant national programmes such as NBSAP, BioSafety and GMO. In Tonga these activities are led by the DoE, MAF, MoFA and relevant civil societies.

Civil Society response:

- Social/Community Forestry Programme promotes replanting of valuable trees on available community, domestic and agricultural land. Species include handicraft species, medicinal species, food/fruit species, ornamental species, cultural species;
- Working with local landholders to preserve fragments of native forest;
- Consultation with landholders on replacing and replanting of trees that have been destroyed or is getting scarce;
- Acquisition and documentation of information of native species, uses, etc.;
- Assisting with rehabilitation/expansion of the Toloa Rainforest, the largest remaining rainforest on Tongatapu; and
- Conducting training sessions in home gardening and traditional medicine.

Organisations that are active in the above activities are Tonga Trust, Langafonua 'a Fefine Tonga, 'Aloua ma'a Tonga, and the Village Women's Committees.

2. INSTITUTIONAL FRAMEWORK

2.1 Implementation and Decision Making

- Ratification of the United Nations Convention on Biological Diversity and the UN Law of the Sea Convention and subsequent implementations of relevant national activities and obligations are led by the MoFA, MoF, MLSNR and the DoE.
- National implementation and decision-making are segmented. Integration are represented by inter-departmental committees, where relevant private sectors and non-government organisations are represented.

2.2 Legislative and Policy Platforms

Legislation that has provisions for sustainable management of biodiversity are, like other natural resource management legislation in Tonga, quite old, contain archaic provisions irrelevant to present day needs, and provide little protection of biodiversity and their habitat.

These legislations are:

- 1976 Parks and Reserves Act
- 1989 Fisheries Act that repealed the Whaling Industry Act. The only direct reference to whales in the Fisheries Act is in the regulation-making power where section 59, subsection (2) provides:

Without limiting the generality of subsection (1) the Minister may in such regulations provide for all or any of the following:

(d) prohibiting fishing for whales or other marine mammals

- The Birds and Fish Preservation Act, now repealed by the Birds and Fish Preservation (Amendment) Act 1989 offer protection for turtles during the breeding season, however, lack protection for the breeding sites

- Fanga'uta and Fangakakau lagoon is the oldest protected area should be covered by the prohibition of destroying of mangroves under the Birds and Fish Preservation Act, but this was never enforced. Similarly, the same act offers protection for birds such as the Tongan megapod, Tongan whistler and the shrike bill; however, apart from lack of enforcement, birds' habitat have very limited protection.
- A Fisheries Management Bill (2001) is in the pipeline to sustainably manage aquaculture activities.

2.3 Cooperation & Participation

Regional and international intergovernmental organisation such as UNDP, FAO, SPREP, SPC and non-governmental organisation such as WWF, FSP have assisted Tonga in various initiatives and activities related to Biodiversity.

3. NEEDS & CONSTRAINTS

- Existing legislation is very limited and outdated;
- Limited funding for training and awareness programmes in the communities;
- Limited availability of land and the fragility nature of the small, young island ecosystem;
- Limited relevant capacity in Civil Society Organisation;
- Unrealistic timeframes of programmes, while tree growth and other biodiversity enhancement activities are long-term requiring long-term support;
- Pressure on farmers for intensified land-use;
- Lack of realization of the economic value of standing trees and forest products;
- There is a need to provide resources for enforcement;
- There is a need to monitor and evaluate government and civil societies activities to identify problems, learned from lessons learned and widely disseminate and publicize success stories;
- There is a need to decentralised resource management to include the people who actually use the resource daily;
- Lack of awareness and a holistic approach to the integrated nature of resource management among decision makers which slows down and hinders progress in the area of sustainable management of biodiversity resources;
- There is a need to substantially improve on the actual amount of resources (fund, time, technical experts, activities implemented, monitoring etc) eventually spend in Tonga from regional and global projects; and
- There is a need to preserve traditional knowledge and skills.

Chapter 11: Management of Wastes

Context

The management of solid waste (garbage or rubbish) on Tonga is poor and is having a detrimental impact on the health of the community and the environment. Results from household surveys that identified key environmental problems (Matoto, 1999, 2000 and 2001) and environmental perceptions, knowledge, skills, attitudes and behaviour of the people of Tonga (Prescott 2000 and 2001), waste management was identified as the biggest environmental problem in Tonga and requires a very high priority for government and communities responses. Poor solid waste management practices include:

- Unsightly littering and indiscriminate dumping of solid waste in drains, waterways, on public and unoccupied private lands;
- The attraction and proliferation of insects, vermin and pests;
- Health risks; and
- Pollution and degradation of local drains and waterways, e.g. lakes, wells, coastal areas and wetlands, which is having a detrimental impact on local flora, fauna and the livelihood of the local community.

It is only Nuku'alofa in Tongatapu and Neiafu in Vava'u that have a designated rubbish dump site. The Tukumonga Dump in Nuku'alofa is an open dump with no prior or on site sorting, likewise the Dump in Neiafu, Vava'u. There are currently 3 incinerators in Tonga. One is operated and managed by the Quarantine Division of the Ministry of Agriculture and Forestry, the other incinerator is with the Ministry of Health and the third for waste oil managed by the Ministry of Marine and Ports. Currently, two are not in operation due to mechanical and spare part problems and administrative constraints.

Sewage is collected in household septic tank/s, and only serviced by septic trucks when full and reported. Currently there are drying beds for sewage nearby the existing Tukumonga dump.

Littering and indiscriminate dumping of solid waste has become a major problem through out the urban areas of Tonga. Beaches, vacant land, road sides have become dump sites for old vehicles and other metal parts that could not be burned, diapers/nappies, wholesale/retail wastes and domestic wastes.

As reported by TEMPP (2000), a UN study in 1996 estimated that some 460,000 litres of oil is used each year in Tonga. However, what proportion of this becomes waste oil is not known. Current practices for disposal of waste oil include some reuse, dumping at the dumpsite, or pouring into drains, the lagoons, the sea and onto vacant land.

A survey of Persistent Organic Pollutants (POP's) in Tonga was carried out (SPREP and AusAID, 1998).

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

Solid Waste Management Programmes

There have been several attempts to improve the management of solid waste on Tongatapu. These include:

- A strategy to improve the disposal of solid waste and sewage, contained in "The Kingdom of Tonga Action Strategy for Managing the Environment" (NEMs), prepared in 1993;
- Advice provided by the WHO Western Pacific Regional Environmental Health Centre, based upon missions to Tonga in 1990, 1992 and 1995; and
- The upgrading of the Tukumonga waste disposal site by the MoH with funding from the WHO in 1996/7.

Solid waste management was picked up again by the AusAID funded Tonga Environmental Management and Planning Project (TEMPP) from 1998 - 2001 coordinated by the DoE. Programmes achieved through TEMPP were:

- Identification of potential new dump sites;
- Conduct a Environmental Impact Assessment study of the new Tapuhia Solid Waste Management Site;
- A solid waste characterisation study was jointly implemented by SPREP and TEMPP;
- A Solid Waste Management Plan (2000) was produced and approved by the Government of Tonga;
- A Management & Operation Plan 2001 for the Tapuhia Sanitary Landfill and subsequent closing of the existing Tukumotonga dump was approved by Cabinet;
- AusAID has committed to build the Tapuhia Sanitary Landfill in 2002 and assist in improving the Solid Waste Collection Service;
- The DoE annual National Environment Awareness Week, which include beach clean up, public areas clean up, singing competition and art competition, radio spots new letters and information sheets; and
- Community Clean-up campaign for the whole of Tonga funded by SPREP and coordinated by the Tonga – Pan Pacific Women’s Organisation.

Hazardous Waste

- National Profile of Chemicals Management Infrastructure was completed coordinated by DoE;
- Inventory of PCB contaminated oil completed; and
- Environmental Codes of Practice for Automotive Industries specifically for the proper disposal of waste oil.

Key areas monitored for pollution from land-based activities:

- organic pollutants including pesticides - samples tested taken from soil, lagoon sediments and shellfish;
- sewage;
- heavy metals;
- excessive nutrients from organic sources and sediment mobilisation;
- oils and solid wastes including plastics and litter; and
- physical disturbances including habitat modification and destruction.

A Draft Pesticide Bill has been developed.

Marine Pollution

- A Marine Pollution Bill was developed by the Ministry of Marine and Ports; and
- Developed a National Marine Spill Contingency Plan and supports the Pacific Pollution Prevention Programme (PACPOL), coordinated by the Ministry of Marine and Ports.

The following programmes are being implemented by the DoE:

- Ongoing scientific monitoring of water quality & biological organisms;
- Identified pollution sources;
- Waste Awareness & Education Programmes; and
- Data acquisition & monitoring system.

Civil Society Responses:

- Training workshops for youth, women, village groups, and others, on Waste Management, including sorting, reducing, reusing, and/or recycling waste;
- Training workshops on paper making (recycled paper) using contemporary *ngatu*, old paper, and discarded green waste;
- Training workshops on flower making using recycled paper, plastic and metal waste;
- Training workshops on use of a glass Kiln to produce marketable products from discarded glass bottles;
- Obtaining sewage trucks for trucks for collection and disposal of rubbish for the 2 island group ('Eua and Ha'apai);
- Participation in consultations on waste management;

- Watch dog" role on waste disposal of mortuary to the Fanga'uta lagoon;
- Coastal Clean-up and Town Pick-up of rubbish with youth groups;
- Organizing the mass collection of empty drink cans to sell to the recycling centers for the purpose of donating funds to a needy charity;
- Recycling of household organic waste into organic composting promotes through training workshops;
- Incorporate schools to do clean up rubbish picking activities;
- Training workshops on production of organic compost from household waste, and use in home vegetable gardens;
- Recycling of household organic waste into organic composting promotes through training workshops; and
- Pesticide Awareness Project promotes alternative biological pest controls.

2. *INSTITUTIONAL FRAMEWORKS*

2.1 Implementation and Decision Making

- International Convention
 - Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989); and
- Regional Agreement
 - Waigani Convention 1995, which compliments the Basel Convention

The Health Act empowers the MoH to collect and dispose of solid waste in the Kingdom of Tonga. To improve solid waste management within the Kingdom, the GoT has established a Waste Management Committee to coordinate the various Ministries and facilitate waste management initiatives.

2.2 Legislative and Policy Platforms

Waste Management Policy

The Tongan Government currently has no waste management policy.

Legislation and Regulations Relating to Waste Management

The MoH has the responsibility for management of solid waste in Tonga. This includes waste collection, waste disposal and maintenance of the waste disposal site. Legislation and regulations which address solid waste management in Tonga include:

- Town Regulations (Amendment) Act of 1974
 - it is illegal to litter on any government roads, public places, beaches and properties of other persons. Penalty fees are stated within up to T\$50 and/or imprisoned for up to 6 months. It also includes compensation of up T\$50 to any person injured as a result of the littering.
- Garbage Act 1949
 - as amended, defines garbage to include household refuse, empty cans, rubbish, trade refuse and waste, but not night soil. Section 8 of the Act requires every owner or occupier of a premises to keep garbage cans covered, clean, in good repair and easily accessible to the garbage collector. Garbage from premises must be deposited in garbage cans and not deposited on roadways, vacant land, foreshore, streams or creeks.
- Public Health Act 1913 and Regulations
 - define "refuse", allow the Minister of Health to declare certain places to be dumping grounds, and also provides remedies for environmental problems under the law of the public nuisance. Abatement notices and fines can be imposed for creation of public nuisance caused by accumulation of waste on properties.

- Public Health Act 1992
 - Part VI addresses Waste Disposal and provides the Minister for Health and its officers with a range of powers.

There is no legislation for the management and disposal of hazardous waste in Tonga.

2.3 Cooperation & Participation

A Working Group was established comprising of representatives from the MoH, MoW and DoE and will report to their respective Ministers and the Waste Management Committee. The Working Group may draw upon the resources and expertise of the represented ministries and external expertise as required and available from aid agencies.

3. CAPACITY BUILDING

3.1 Awareness, Education and Training Activities

Pacific Regional Waste Awareness and Education Programme

There have been some workshops coordinated by SPREP and DoE mainly focused for Government Agencies, private enterprises and NGOs held in Tonga.

A solid waste characterisation study had taken place in October 1999 funded by the European Union (EU). The main results were:

- to assist the development of appropriate methodologies and material that could be applied to Tonga and the Pacific region in order to increase awareness and education on solid waste issues and on related possible solutions; and
- recommendations on further activities in the areas of waste treatment and legislation.

Department of Environment

Lagoon Watch is a programme run by the communities, for the communities. Key people have been identified and are committed to this programme. They are relied upon to maintain a high level of participation in on-the-ground practical management activities such as litter control, fencing to protect young mangroves from pigs, beach clean-up activities, and planting of mangroves in denuded areas.



This programme transfers information to communities on awareness of environmental issues: mangrove maintenance, control of animals, escape of sanitation wastes, dumping of litter, infilling of the lagoon and other environmental issues. Dissemination of this information is by occasional radio programme interviews, information sheets/newsletters, community workshops and occasional television programmes.

Ministry of Health

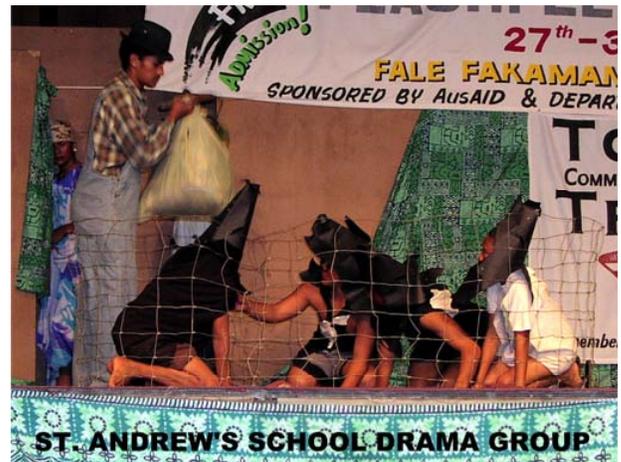
Occasionally, the Ministry has a radio programme interview dealing with waste management. Another activity carried out is several community workshops and community clean-up inspections.

Non-Government Organisations

Many NGOs carry out some sort of education programmes, which ranges from formal (quarterly newsletters, radio programme interviews, management activities – e.g. village clean-up) to informal education programmes (e.g. performing dramas in villages) on various environmental issues. These include home composting, recycling, village sanitation and village waste management activities such as compost toilets and paper making.

Others

For the curriculum of secondary education, internal assessments are assigned for Form 6 and 7, which make up a substantial amount of their grades. A list of topics is given out for students to choose from and waste management is part of this selection.



4. NEEDS & CONSTRAINTS

- GoT should undertake a more detailed review of existing legislation and regulations relating to the regulation of solid waste management, and in particular review the effectiveness of existing anti-littering and anti-dumping laws;
- Enforcement requirements of the Health Act are ineffective, need to enforce;
- Lack of human resources;
- Need to show the public on how to minimise waste and recycling and emphasis its importance;
- Lack of land space;
- Need ongoing public education programmes to discourage littering and dumping of solid waste;
- Some recycling processes are too lengthy, complex and costly. Greater range of appropriate methods and options to reduce/re-use/recycle are needed;
- Reliance on foreign expertise is costly and limits expert input;
- Limited CSO resources (funding and manpower) are a constraint;
- Some CSO can only make appeals to relevant authorities on environmental issues that have been raised by its members;
- Need a good supportive team and to maintain the depth of experience within the CSO as well as management our members; and
- Scope of several projects is geographically limited because of insufficient resources.

Chapter 12: Natural and Environmental Disasters

Context

Throughout the history of Tonga, there are basically two forms of disasters: cyclones (hurricanes) and earthquakes. Tropical Cyclones remain as the most likely and most consistent threat to the Kingdom; however, other hazards such as earthquakes and volcanic eruptions can occur with significant impact upon the social and economic environments.

Whilst these remain as the major threats, associated hazards – such as flooding to low lying areas, storm surge, high surf, sea spray, tsunamis, drought and exotic disease for plants and animals – present equally high levels of concern to vulnerable communities and industry.

Anthropogenic environmental disasters are usually related to ad hoc development when local environment factors are not carefully considered; to population-related pressures, or to negligence and accidents. Such environmental disasters that have occurred in Tonga include oil spills, gas explosions, conversion of wetlands for residential and commercial areas, fish poisoning, fires, deforestation and building of causeways with major design faults that hinders circulation and fish migration route.

1. ACTIVITIES AND PROGRESS

1.1 Programmes and Projects

- **National Disaster Management Office**

This was established at the Ministry of Works as the key focal point for the management and promotion of disaster management programmes and activities.

- **National Disaster Management Plan & Emergency Procedures**

The plan focuses on a comprehensive disaster management strategy that clearly identifies and documents the essential organizational and procedural ingredients for effective mitigation of, preparedness for, response to, and recovery from, hazards and disaster situations.

- **National Marine Spill Contingency Plan**

A draft plan has been developed by the Ministry of Marine & Ports, in consultation with other related agencies to deal with oil spills, in addition to oil company businesses who are trained and equipped to handle spills at off-loading points.

Supports the Pacific Pollution Prevention Programme (PACPOL) of which the Department of Environment and the Ministry of Marine & Ports are the implementing agencies for projects under this programme.

- **Installment of a Seismometer to detect and measure earth movement**

This is part of a research project to improve Tonga's knowledge of structure and dynamic of the deep interior of the earth and to promote seismology in Tonga. This initiative is funded by the Government of Japan and coordinated by the Geological Section of the Ministry of Lands, Survey and Natural Resources.

- **National Monitoring Committee**

A Cabinet established committee to monitor environmental status of lagoons, coastal waters and report to the Cabinet the State of the Environment of Tonga.



- **Upgrading of cyclone warning system**
Dissemination of cyclone warnings and special weather bulletins are carried out the Tonga Meteorological Services in collaboration with the Fiji Meteorological Services in Nadi.
- **National Profile of Chemicals Management Infrastructure in the Kingdom of Tonga**
An Assessment of various aspects of chemicals production, import, and use in Tonga. A National Chemicals Coordination Committee was established by Cabinet to conduct the assessment. The assessment was in collaboration with UNITAR and SPREP.

Civil Society Responses:

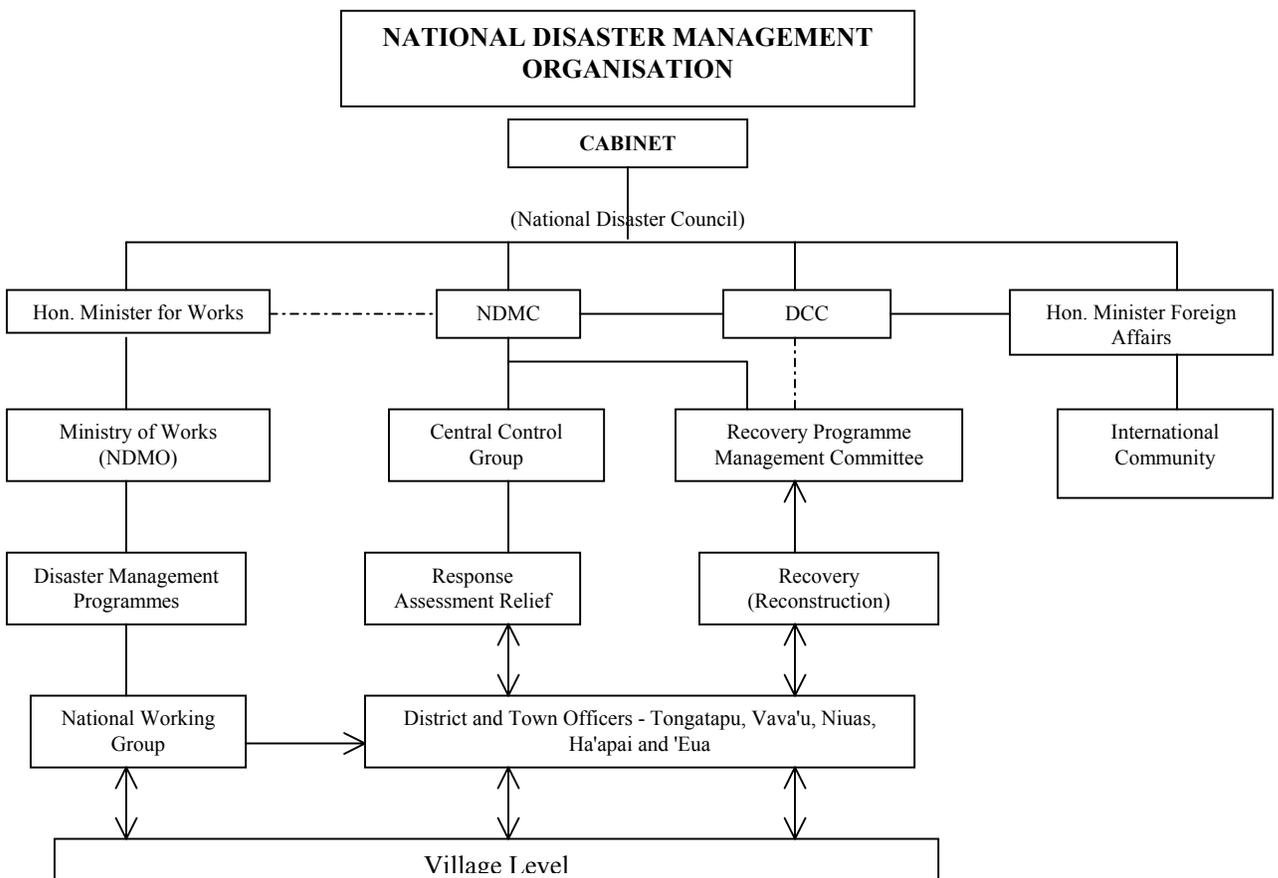
- Heightened public awareness of natural disasters (particularly cyclones) through use of drama/theater to promote community education about natural disasters, causes, prevention and safety measures.
- Informal NGO disaster management networks, utilizing NGO members to assess and report on post-disaster cyclone damage.

2. INSTITUTIONAL FRAMEWORKS

There is a disaster management organizational structure (Figure 3) which identifies the National Disaster Management Office (NDMO) as the management mechanism within the Ministry of Works as the key focal point, and the operational response mechanisms, which are guided by the National Disaster Management Committee.

The National Disaster Council (NDC) has the overall authority and responsibility for disaster management programmes and activities, including response issues.

Figure 3: Disaster management organisational structure



2.1 Implementation and Decision Making

National Disaster Management Committee (NDMC)

- responsible to the NDC for guiding and supporting the development and implementation of the Kingdom's disaster management programmes, and for the provision of resource support and technical advice during disaster response operations. There are more than 20 members of the NDMC, which comes from the Governments, NGO's, Boards and Civil Societies

2.2 Legislative and Policy Platforms

The NDMC implements policy directions from Cabinet and Privy Council. Tonga's Building Code has requirements for building standards to minimize damages caused by natural disasters and fires.

2.3 Cooperation & Participation

National Level

- National Disaster Management Working Group (NDMWG)
 - established to ensure that a reliable and available support mechanism for programme activities is in place. The group comprises of a broad base of Government Agencies, NGOs, and the Private Sector.

Community Level

- District/Town Officers and village Committees
 - Officers have specific responsibility for the supervising of the preparation of village disaster plans, supporting the NDMWG in the identification and implementation of community mitigation and preparedness programmes, ensure warning and community alerts are received and understood by villagers, and report damage assessment results to the national emergency operations centre.

3. CAPACITY BUILDING

The NDMWG, assists the NDMO in the management of training in support of programme activities and professional skill development.

3.1 Communication and Awareness

Communication with the communities and awareness raising includes the following programmes:

- pre-recorded radio broadcasts which describes the stages of the cyclone alerting system, and the action that should be taken for each stage;
- pamphlets which support the pre-recorded messages by displaying the alert stages;
- posters and/or pamphlets which describe cyclones and highlight the associated dangers which usually come with them (i.e. flooding, storm surge);
- visits to schools and to villages to discuss cyclones, community preparedness, and to identify major threat areas which villages should be wary of; and
- briefing sessions for District and Town Officers on the community alerting system and key preparedness activities.

4. *NEEDS & CONSTRAINTS*

- There is a need for appropriate equipments and related training for oil spills, for fires and for chemical spills or for gas explosions;
- There is a need to upgrade school laboratories and accreditation of existing government laboratories for the proper management of chemicals and to allow for the testing and monitoring of chemicals in Tonga;
- Lack of continued assistance for the implementation of relevant existing national programmes;
- Need for human resource development;
- The inappropriate use of chemicals, namely the lack of protective equipment worn when handling chemicals and a lack of regard for the environmental consequences of the improper use of chemicals;
- The lack of adequate occupational health and safety provisions in the workforce; and
- The improper storage, transport and distribution, with few safety provisions, of a wide range of chemicals.

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ANNEX 1: PREPARATORY PROCESS FOR THE TONGA NATIONAL ASSESSMENT REPORT (NAR) FOR - THE WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (WSSD) RIO+10 -

In preparation for the World Summit on Sustainable Development 2002, a global review was underway to document:

- Past achievements and activities since the 1992 Rio Summit
- Constraints and obstacles encountered in implementing the Agenda 21
- Priorities for the future

The agency responsible for coordinating the preparatory process for the Tonga National Assessment Report was the Department of Environment.

It is recognised that, as in other small Pacific island nations, a partnership of all involved parties is essential. It is fundamental that this partnership must involve both Government, and Civil Society Organisations. Therefore, broad participation was essential to the NAR, in order to obtain consensus agreement on key sustainable issues important to Tonga.

A Steering Committees was established to coordinate the review, the preparation process and the Multi-stakeholder Consultation Workshop

Steering Committee Members:

- Department of Environment
(Ms. Netatua Prescott, Coordinator; and Ms. Lupe Matoto)
- Ministry of Finance
(Dr Ngongo Kioa)
- Ministry of Foreign Affairs
(Mr. Suka Mangisi)
- Central Planning Department
(Ms. Lupeolo 'Ofa)
- Tonga Community Development Trust
(Mr. Denis Wolff)

Government and Civil Society activities were assessed focusing on the implementation of the Agenda 21 and the Barbados Programme of Action in the following areas:

- Chapter 1: Socio-economic Dimensions
- Chapter 2: Human Resource Development
- Chapter 3: Land Resources
- Chapter 4: Coastal & Marine Resources
- Chapter 5: Freshwater Resources
- Chapter 6: Tourism Resources
- Chapter 7: Transportation and Communication
- Chapter 8: Energy Resources
- Chapter 9: Climate Change
- Chapter 10: Biodiversity Resources
- Chapter 11: Management of Wastes
- Chapter 12: Natural and Environmental Disasters

ANNEX 2: NATIONAL MULTI-STAKEHOLDER CONSULTATION WORKSHOP

The National Multi-Stakeholder Consultation (NMC) was held on 18-19 December 2001, in Nuku'alofa. The opening ceremony was addressed by Her Royal Highness Princess Salote Mafile'o Pilolevu Tuita. Thirty-eight agencies (17 Government and 21 Civil Society) were invited to participate. A list of participants is shown below.

Working groups and reporting to plenary was the medium of the workshop. On *Day One*, participants discussed the assessment and review, and Day Two was the 'Way Forward'. The groups were as follows:

Group #1

Land Resources
Freshwater Resources
Coastal/Marine Resources

Group #3:

Climate Change
Energy Resources
Transport & Communication

Group #2:

Waste Management.
Natural & Environmental Disasters
Biodiversity Resources

Group #4:

Socio-economic Dimensions & Framework
Tourism Resources
Human Resource Development

Participant List

Govt. Organisations

1. Ms. Linda Folaumoetu'i, Crown Law Department
2. Mr. Siosiuva Halavatau, Ministry of Agriculture and Forestry
3. Ms. 'Apisake Soakai, Ministry of Lands, Survey & Natural Resources
4. Mr. Vailala Matoto, Ministry of Fisheries
5. Dr. Ngongo Kioa, Ministry of Finance
6. Mr. Tevita Niu Lata, Ministry of Labour, Commerce and Industries
7. Mr. Viliami Manu, Ministry of Marine & Ports
8. Mr. Setalingi Payne, Ministry of Marine & Ports
9. Mr. Viliami Liava'a, Central Planning Department
10. Mr. Tatafu Moeaki, Central Planning Department
11. Dr. Malakai 'Ake, Ministry of Health
12. Mr. Vili Vete, Ministry of Education
13. Mr. Sione T. Finau, Tonga Water Board
14. Mr. Tavake Kakala, Tonga Electric Power Board
15. Mr. Uilou F. Samani, Department of Environment
16. Ms. Netatua Prescott, Department of Environment
17. Mr. 'Asipeli Palaki, Department of Environment
18. Ms. Lupe Matoto, Department of Environment
19. Mr. Taniela Faletau, Department of Environment
20. Mr. Taniela Fusimalohi, Tonga Visitor's Bureau
21. Ms. Mele Lupe Vunipola, Tonga Visitor's Bureau.

Civil Society

1. Ms. Finau Tongotea, 'Aloua Ma'a Tonga
2. Mr. Denis Wolff, Tonga Trust
3. Ms. Papiloa Foliaki, Dr. Supileo Foliaki Foundation
4. Ms. Lee Miller, Tonga Chamber of Commerce
5. Mr. Sioape Tu'iono, TANGO
6. Mr. Werner Gehle, Tonga Export Fisheries Association
7. Mr. 'Alifeleti T. Taufu, Tonga National Council of Churches
8. Ms. Lesieli Niu, Tonga National Youth Congress
15. Ms. Silongo Fakasi'i'eiki, Tonga Red Cross Society
16. Ms. Kato Latavao, Tonga Red Cross Society
17. Ms. 'Akanete Ta'ai, Tonga Human Rights & Democracy Movement
18. Ms. Litia Tapu, PPSEAWA

ANNEX 3: NATIONAL ENVIRONMENTAL COMMITTEE (NEC)

A National Environmental Committee (NEC) was also established, which consists of Heads of Ministries/Departments and NGOs.

1. Director for Department of Environment (Chairperson)
2. Director for Ministry of Agriculture & Forestry
3. Secretary for Ministry of Marine & Ports
4. Director for Tonga Visitors Bureau
5. Director for Ministry of Foreign Affairs
6. Secretary for Ministry of Foreign Affairs
7. Secretary for Ministry of Finance
8. Secretary for Ministry of Fisheries
9. Secretary for Ministry of Lands, Survey & Natural Resources
10. Secretary for Ministry of Labour, Commerce & Industries
11. Director for Central Planning Department
12. Director for Ministry of Works
13. Director for Ministry of Health
14. Chief Secretary and Secretary to Cabinet, Prime Ministers Office
15. Solicitor General, Crown Law Department
16. Secretary General, Tonga Association Non-Government Organisation (TANGO)