Government of Samoa

WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT ASSESSMENT REPORT

FOREWORD:

The United Nations Conference on the Environment and Development in 1992, established sustainable development as a new paradigm that would not only deal with global environmental challenges, but also with the social fabric of nations and ultimately have a direct impact on the lives of people world wide.

A new era of environmental awareness was heralded. The world appeared prepared to address globally unsustainable patterns of production and consumption through a more rational and integrated approach between the environment and development. Sustainability became a major feature of macroeconomic planning. There was recognition of the importance of forging closer global links between developed and developing countries. With globalisation came a new sense of collective concern that poverty and regressive development were powerful causes of environmental degradation. The international community has come a long way in building an enduring consensus with respect to issues on the global environment agenda. The Kyoto Protocol and its adoption in 1997 was a significant breakthrough in this direction. In November 2001, global consensus, with the notable exemption of the United States enabled the Kyoto Protocol to progress and adopt an implementation plan.

Climate change is of utmost concern to low lying small island states. While small, island nations have been strong in making their voices heard on issues, which cut to the very core of their viability and survival as nation states. Reducing the risks of climate change, conserving and sustainably using existing stocks of natural resources and biological diversity, management of wastes, controlling pollution, protecting international waters and sound economic management and governance reforms are some of the key areas island states must vigorously pursue for they hold the key to the alleviation of poverty and improving the quality of life for all.

Samoa has been doing its best to participate in international and regional efforts to address key issues related to environmental conservation and sustainable development. Domestically the government has also implemented conservation programmes in an integrated manner with its economic and governance reforms. Looking ahead, Samoa shall continue its participation in regional and international collective efforts to address environmental and sustainable development issues and pursue cooperative arrangements between the government and private sector and non governmental organisations to advance environmental integrity and achieve sustainable development for the benefit of future generations. Samoa has learnt valuable lessons in incorporating environmental values into decision-making and actions on development. While we recognise that no single approach can be adopted universally, selective application would yield tangible benefits.

Samoa has come a long way in the implementation of Agenda 21 within the constraints of financial resources and has been assisted to a large extent by its development partners. The costs of inaction to the welfare of our people and our natural environment will be felt over the long term and we must ensure that we utilise every opportunity that comes along to implement sustainable development as a common goal and this will be possible with the active support of all our citizens.

The Johannesburg Summit is a timely occasion for the world over as it comes at a turning point when countries like Samoa are ready to harness the positive influences of the sustainability process.

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ACRONYMS USED:

CBD:	*Convention on Biological Diversity*
CEIS:	*Coastal Environmental and Institutional Services*
CIMS:	*Coastal Infrastructure Management Strategy*
COP:	*Conference of the Parties*
DEC :	*Division of Environment and Conservation*
DLSE:	*Department of Lands, Surveys and Environment*
DP7:	*Seventh Development Plan*
EIA:	*Environment Impact Assessment*
EPC:	*Electric Power Corporation*
FAO:	*Food & Agriculture Organisation*
GCRMN:	***Global Coral Reef Monitoring Network***
GEF:	*Global Environment Facility*
GHG	***Greenhouse Gases***
GOS:	*Government of Samoa*
IAMP:	*Infrastructure Asset Management Project*
IRP:	*Institutional Reform Policy*
IUCN:	*International Union for the Conservation of Nature*
MAFF:	*Ministry of Agriculture, Fisheries and Forestry*
NBC:	*National Beautification Committee*
NBSAP:	*National Biodiversity Strategy Action Plan*
NEMS:	*National Environment Management and Development Strategies*
NGO:	*Non-Government Organizations*
NLP:	*National Landuse Policy*
NOU	***National Ozone Unit***
NPPSD:	*National Population Policy for Sustainable Development*
NWMP:	*National Waste Management Policy*
NWRP:	*National Water Resource Policy*
ODS:	*Ozone Depleting Substances*
PEAR:	*Preliminary Environment Assessment Report*
PICCAP:	*Pacific Islands Climate Change Programme*
POP's:	*Persistent Organic Pollutants*
PSC:	*Public Service Commission*
RMP	***Refrigerant Management Plan***
SES:	*Statement of Economic Strategy*
SIDS:	*Small Island Developing States*
SNCRT:	*Samoa National Coral Reef task team*
SOE:	*State of Environment Report*
SPREP:	*South Pacific Regional Environment Programme*
SPRIG:	*South Pacific Regional Initiative on Forest Genetic Resources*
STEC:	*Samoa Trust Estates Corporation*
SWA:	*Samoa Water Authority*
TEC's:	*Target Environment Components*
UNFCCC:	*United Nations Framework Convention on Climate Change*
UNCED:	*United Nation Convention for Environment Development*

VLCRMP: Village Level Coral Reef Monitoring Project

EXECUTIVE SUMMARY

Since the adoption of Agenda 21 following the United Nations Conference on Environment and development in 1992, this report constitutes the first opportunity for Samoa to assess its situation with regard to sustainable development in the past decade.

Samoa is classified as a Least Developed Country mainly because of its vulnerability to natural disasters and to external economic and trade developments for which it has no control. Despite these potential constraints, considerable progress has been achieved in the comprehensive reform programmes of the Government. While poverty is far from endemic in Samoa, there is a growing number of vulnerable groups facing hardship which together with a paucity of opportunities, can lead to vulnerability to poverty; this situation is given emphasis in the current Strategy for the Development of Samoa (SDS) which has as its theme the creation of opportunities for all.

Samoa has a population growth rate that slightly lags behind its economic growth rate, albeit the former is influenced by high migration. Its narrow resource base has pushed it towards diversification and the development of its human resources and at the same time ensuring that the natural resources it has, is well and efficiently managed.

Its performance in the 1990s saw the implementation of numerous activities that were tangible evidence of the importance the government of Samoa placed on environmental concerns within its development framework, following the establishment of the Division of Environment and Conservation (DEC) in the Department of Lands Surveys and Environment. The establishment of DEC was premised on the government's conviction that sustainable development will only occur through institutionalised environmental planning and management supported by appropriate legislation.

In 1993, the Government developed its National Environmental Management Strategies (NEMS) setting out the procedures and structure for environmental management and sustainable development. Corresponding policies under the NEMS framework have since been adopted with more under formulation.
The Government in further demonstration of its commitment adopted 13 international and 5 regional agreements. Implementation of the various conventions and protocols are at varying stages of progress.

In recognition of the fact that existing national laws were inadequate in providing comprehensive environment protection, a review of environment legislation took place in 1993, which resulted in the revision of, as well as introduction of new, legislation.

Revised legislative measures were accompanied by institutional restructure in order to translate development policies and such international accords and conventions into action. Ongoing reforms has seen a refinement of functions to avoid overlap and the adoption of an integrated approach to ensure that environmental considerations are part

of the development planning process has manifested itself in recent strategic plans of the government.

A number of specific projects and programmes have been implemented as a result of Samoa becoming a signatory to the various international/regional conventions and protocols and as a response to a pressing need for proper management of infrstructural assets.

Capacity building has been effected through public awareness and education programmes carried out on a regular basis as well as dedicated programmes to commemorate events such as Environment week; Ozone, Climate Change and Waste Management Days each year. As well training of professional staff is an ongoing process. Considerable investment in human resource development has laid the groundwork for an educated skilled and healthy labour force to meet the challenges of social and economic development in the years ahead.

Key emerging environmental concerns includes waste management, increasing urbanisation and the conservation of fast depleting natural resources.

The Way forward:

Samoa's vision for the future is a nation that is characterised by macroeconomic stability, a thriving and competitive private sector and an efficient public sector; adequate employment opportunities, best practices for good governance, quality health and education services, dynamic development of its key agriculture, fisheries and tourism sectors, vibrant socio-cultural values and sustainable management of the environment.

- To achieve its vision, there is a need to foster development by bringing people into the process through initiating policies that makes development more participatory and equitable, involving all stakeholders in decision making at all levels particularly in natural resources management, improving incentives for people to manage resources sustainably, enhancing opportunities for low income earners to enter the formal economy, promoting a greater role for NGOs in development and using information technology for awareness raising.

Some of the more specific recommendations are as follows:

- There is a need to consider **institutional arrangements for the promotion of sustainable development and the corresponding capacity building** in a number of areas including information dissemination through communications networks and public outreach,, training, strategic planning and participatory consultation workshops, the creation of expert panels to provide technical information as well as logistical support, equipment and materials.

- Priority to be given to the **completion of all proposed policies** under the NEMS as well as others in furthering the stand of legal instruments to enforce sustainable development approaches that prioritise environmental concerns. There is a need to review all existing legislation inn order to provide a sound climate for an integrated operational arrangement between government agencies and other relevant stakeholders.

- To address a **high population growth rate and impacts of urbanisation**, there must be concerted efforts to establish an integrated planning and management system that is responsive to urban growth pressures and one, which builds on the

existing capabilities of agencies and village groups already servicing the urban area. The system should provide regulatory policies and frameworks that would ensure good delivery of services required to sustain the quality of life desired.

- There is a need to create employment opportunities for the ever-increasing youthful population in both the formal wage and non formal sectors and ensure parallel **productive skills training**.

- To **reduce inequality and provide assistance to disadvantaged groups** requires institutional advancements such as the devolution of responsibilities over natural resources to the local levels, improving social services delivery, redirecting investment to open up a greater range of environmentally friendly economic opportunities and livelihood options as well as promote entrepreneurial drive and small scale enterprise development

- To ensure the proper **utilisation of land resources**, there is a need to promote land capability guidelines and an integrated system of land information that developers can use to guide the best development methods to the most suitable land. Such measures can now be strengthened under the umbrella of the recently approved Land Use Policy.

- With the policy environment in place, it is important to enhance **biodiversity conservation** by broadening activities through projects that capture the value and security of biodiversity. In this way, the idea of sustainable development is being complemented by sustainable conservation. The replication of marine protected areas under the IUCN/World Bank project which demonstrates the concept of bio-regional planning is a step towards ensuring a good balance between conservation and development

- The way forward for **marine resources** is to strengthen and revitalise management regimes including traditional ones through enhanced awareness of fisheries issues that are supported by scientific evidence and precautionary approaches.

- The potential impacts of **weather variability** and progressive sea level rise are likely to impact significantly on Samoa. There is a need to identify cost effective and adaptive management approaches and national disaster response strategies to these impacts, which must be incorporated into national strategic plans. There is a need to develop a policy for the protection of ambient air quality as well as a supportive legislative framework to control emissions.

- Rapid growth in the commercial **energy sector** brings with it increasingly urgent requirements for prudent management. Central to this is the development of an energy policy to be supported by institutional measures. Careful monitoring of government owned energy supply companies and facilities as well as the promotion of viable renewable energy development are some of the key priority areas to be addressed.

- To address the challenges faced in the **water resources sector** such as a fragmented management approach and lack of understanding of related issues, there is an urgent need to develop a Master Plan. High priority should be given to the enforcement of Environmental Impact Assessments regulations in order for water abstractions and associated developments to be sustainable in the long term.

- The review and **monitoring** of the Barbados Plan of Action and its derivatives as well as regional based programmes and projects are integral to the sustainable development of Pacific island countries. In this connection there is an urgent need to strengthen the links between the environment and integrated development by building capacity through education, training and awareness programmes, the development of appropriate benchmarks for sustainable development, information sharing and the use of quality data for decision making.

INTRODUCTION:

Samoa, a small island country in the South West Pacific was the first to become independent in 1962. It has a Head of State and a unicameral 49 member legislative assembly. Tenure for the legislative assembly is five years. The Prime Minister chosen by the majority in the Legislative Assembly can select up to 12 ministers to form a Cabinet. While all citizens over the age of 21 are eligible to vote, only those that hold chiefly or matai titles are entitled to stand for Parliament.

The people of Samoa are Polynesian, living in 330 villages along the coast and more recently inland with the development of cross-island roads. Samoan society is based on the social unit, the aiga or extended family. Each extended family is headed by a matai who is appointed by consensus of the aiga. The matai assumes responsibility for the welfare of his/her aiga including directing the use of family assets and land. The collective institution of matais constitute the village council or fono which controls the affairs of the village, keep order and provides direction with regard to village development.

The recently completed 2001 Population and Housing Census show a national population total of 174140.

Geography:
The islands of Samoa lie between latitudes 13 and 15 degrees south and longitudes 168 and 173 degrees west. Samoa consists of two main islands and 8 smaller islands. The capital Apia is located on the second largest island Upolu and has a population of about 40,000 people. Samoa has a total land area of 2,935 km^2. The islands are of volcanic origin clearly visible in the form of several dormant volcanoes and lava fields. Beyond the narrow coastal plains, the mountain ranges rise steeply to 1900 metres on Savaii and 1100 metres on Upolu intersected by fertile valleys. Lush vegetation and rainforest cover the greater part of the country.

The two main islands are well served by tar sealed ring and cross island roads. The geographically compact nature of the country and its road and shipping network make transport between and within islands relatively easy, thus facilitating access to centralized government services. There is only one international port with an inter-island ferry service operating between the two main islands and between Samoa and its nearest neighbour American Samoa to the east. Apia Port is currently being upgraded to cater for more berthing space. A regular inter-island air service serves both main islands and American Samoa as well.

Geology & Geomorphology
The Samoan Islands are almost wholly composed of basic volcanic rocks such as olivine basalt, picrite basalt and olivine dolerite of the alkaline basalt suite. The main volcanic formations are Fagaloa; Salani; Mulifanua; Lefaga; Puapua; Aopo; and Vini Volcanics. Most of the soils are formed from basaltic volcanic flows including pahoehoe and aa lava types, scoria, and volcanic ash. Soils are generally clay and texture, free draining, porous and relatively shallow. (ANZDEC, 1990).

Although Samoa is not well endowed with coral reefs, they surround the islands for nearly half of the coastline, except where there are steep cliffs and where recent volcanic flows have covered large parts of the coastal areas. Coral sands are found along most of the coastline, up to 5 m from sea level. Alluvium is not common, but forms the parent material for the most versatile soils

Climate

The climate is tropical and marked by a distinct wet (November –April) and dry (May – October) seasons. The average monthly temperature ranges between 22^{o} and 30^{o} with little seasonal variation due to Samoa's equatorial location. The average annual rainfall is about 3000mm with about 75% of the precipitation occurring during the wet season.

Storm patterns affecting Samoa originate from three main sources; tropical easterlies cause winds from the south east, cold fronts from Australian systems cause cold air to flow and rain; and storms from the south west Pacific generate cyclones at the contact zones of the easterlies and westerlies.

Land ownership

The greater proportion of land (81%) is owned by extended families under customary ownership and the alienation of customary land is prohibited by law. Customary land cannot be transferred nor made freehold although lease arrangements are possible. Eleven percent of the land is government owned and are used mainly for plantation farming, national reserves, public buildings and infrastructure. Five percent of the land remains under the Samoa Trust Estates for commercial plantations although more and more is being sold or leased to the public thus increasing the amount of freehold land available particularly on the island of Upolu which accounts for only 3 percent of the land.

There is a growing trend towards the individualisation of customary land. This change is significant for two reasons; (i) it shows that the traditional Samoan way of life can and is adapting to changing economic circumstances and (ii) the security of land rights is increased with the assignment of tenure to individuals who clear the land and inheritance rights are assigned exclusively to their children. For this reason, the security of tenure is not a significant cause of low productivity in village agriculture but more a result of low economic return to agriculture as compared to other income sources.

Economy

The economy is relatively small with aggregate GDP in current prices of SAT 720 million (approx. US$200 million) in 1999 implying a per capita income of US1,390. Economic performance is constrained by distance to markets, a small local market, a skill base that cannot compete with Asian countries in labour intensive production and vulnerability to natural disasters particularly cyclones.

The agricultural sector accounts for 10-15% of GDP and is characterised by a substantial subsistence base which continues to provide a source of livelihood for over 80% of the population and a high level of domestic food security. More recently, the fisheries sector has replaced agriculture as the dominant export earner.

The second half of the 1990s was characterized by relative prosperity based on strong performances in the tourism and fisheries industries. GDP growth in 1998 was 3.4% rising to 5.6% in 1999 and 4 % in 2000 driven mainly by the fishing sector, construction, commerce, transport and communication. At the same time inflation declined to 0.3% in 1999 the lowest level in five years. Inflation is expected to remain low as tariff cuts resulting in competitive trading conditions work through to consumer prices.

The relatively successful introduction of extensive economic and financial reforms in the second half of the 1990s has made the last decade a historical turning point in the development of Samoa. These reforms have included, building effective partnerships between the government and the private sector, overhauling of the revenue structure for the government based on the introduction of the value added goods and services tax, a reduction and simplification of import tariffs and income taxes, institutional strengthening

of government departments and corporations, corporatisation and privatisation of selected public sector activities, financial sector liberalisation and overall pursuance of good governance principles in the public sector.

Structure of the report

The Report attempts to review the progress made in the national implementation of Agenda 21 since its adoption in 1992 on selected areas of emphasis as well as emerging issues and constraints. Recommendations pointing the way forward follow the review of each major issue discussed under the various chapters as well as an identification of specific proposals that are strategically designed to meet such needs

Chapter 1. SOCIOECONOMIC DIMENSIONS AND FRAMEWORKS FOR SUSTAINABLE DEVELOPMENT

Sustainable development is closely lined to economic, social and ecological factors. The government's policies and measures have concentrated on consolidating the pillars of the sustainable development course and growth based on the promotion of the private sector, expansion in exports as well as increased stakeholder participation in the development process.

1.1. Sustainable economic development

Samoa's economy was devastated by the two cyclones and the taro leaf blight in the early nineties. As a result real gross domestic product in the early nineties declined by 9.4% in 1990 2.1% in 1991 and 0.9% in 1992. This situation was reversed in 1995 when a positive growth of 6.2% was recorded. Strong growth continued into 1996 but weakened again in 1997 as a result of the Asian financial crisis. Economic activity rebounded in 1998 and continued into 2000 registering a 7% growth.

Table 1.0 Real Gross domestic product by sector 1994-2000

(in thousands of tala)

At constant 1994 prices	1994	1995	1996	1997	1998	1999	2000
Agriculture	114913	129474	133568	124848	129076	124566	126488
Manufacturing	131238	131566	137254	133705	120589	126807	149609
Electricity and water	12838	13338	14285	14717	14577	14164	15269
Commerce, Hotels and Restaurants	69791	75036	85988	92069	98178	105335	114532
Transport, Communication	45926	50086	57384	59652	66530	69729	70349
Public administration	45525	46729	50066	54713	59491	63551	67518
Finance and business services	25063	25901	29904	32080	35665	36748	38508
Others	54102	58193	60377	61477	63569	64811	67913
Value added at market prices	499396	530322	568826	573261	587675	605711	650186

The positive growth rates in the latter part of the nineties were driven mainly by the commerce, transportation and communication, and finance and business sectors. Although no quantitative analysis has been done to establish the relationship between the reform policies undertaken and the positive growth rates achieved, one would argue that in the absence of the reform initiatives, private sector growth would have been extremely difficult to realise particularly at a time when most other Pacific Island countries were facing stagnating growth.

1.2 Economic and Financial reforms

Beginning in 1994, the Government put in place the first phase of economic and financial reforms in an effort to create the enabling environment for the private sector to prosper as well as making the economy more open to investment, more competitive, more efficient and more transparent.

A major development initiated in 1995 was the publication of the first Government Statement of Economic Strategy. The Statement of Economic Strategy redefined government's planning approach towards a more strategic, focused and medium term planning framework. It also signalled another major step towards greater consultation on its economic vision and strategies, to strengthen ownership of these strategies while forging a partnership with the private sector and the wider community to promote development.

In 1996, Government commenced a phased programme to support a more competitive and enabling environment for investment and business growth. The most important of these policy measures were implemented in 1998 and included the following:

- First, the financial system was liberalised effective from 1 January 1998. This resulted in the removal of controls on interest and credit ceilings, and allowed the Central Bank to use indirect monetary instruments to manage monetary policy. This measure has greatly increased the availability of credit for investment purposes. In fact commercial bank lending to the private sector has increased by 57% since the beginning of this liberalisation program.
- Secondly, tax and tariff reform measures effected in May 1998 resulted in major cuts to most tariff items from an average of 60% to a maximum of only 20% with significant cuts to import duty rates on business inputs, capital goods and building materials. The personal income tax threshold was revised in 1994 following the implementation of the VAGST, when it was increased from $4,000 to $6,000 on 1 July 1995. It was again increased from $6,000 to $8,000 on 1 January 1999. From 1 January 2000, the income tax threshold was again raised from $8,000 to $10,000 resulting in more take-home pay for everyone. Additionally from 1 January 2000, the company tax rate was reduced from 35% to 29%. Consistent with this arrangement the maximum personal income tax rate was also dropped from 35% to 29% for Pay As You Earn workers.

These reform measures have now made Samoa's tax and tariff regime one of the lowest and most attractive in the region. The reductions in import tariffs and excise have benefited everyone in the country. They have led to lower prices, more competition and greater choice. They have promoted investment, enterprise development and have created job opportunities.

1.2.1 Public Sector Reforms

As part of the reform package, the Government continued with the implementation of its corporatisation and privatisation policy. This policy is aimed at instituting sound commercial practices in the management of all state-owned enterprises. It also has the dual effect of providing a platform to review services that are considered to be better placed with the private sector. Furthermore a public service reform program aimed at reviewing the role and functions of departments was carried out. The intention was to raise the efficiency and effectiveness of the services provided by government departments and agencies. The performance budgeting system was implemented in 1996 with emphasis on outcomes. This approach has greatly facilitated the delivery of outputs as output managers are given greater managerial flexibility to achieve the respective departmental output targets. The system is now well established throughout government and is being continually revised for improved service delivery.

The government has also invested heavily in institutional strengthening and capacity building on the premise that for the reforms to be effective and successful, departmental structures must be strengthened. Over the past 5 years, overseas development assistance has placed great emphasis on the strengthening of government departments and corporations.

1.3 Fiscal Policy

Consistent with the reform program and the push for private sector development, the government in the last five years, has remained committed to maintaining a firm fiscal stance. The government continues to maintain responsible and well targeted spending to the areas of need and priority in the community within the limits of the resources available. This responsible approach to financial management resulted in overall budget surpluses in fiscal years 1996/97 and 1997/98.

The tight fiscal policy has facilitated growth in monetary policy to support private sector development through increased credit. On the exchange rate, Government through the Central Bank, maintains a close watch of exchange rate movements to ensure the competitiveness of the currency is not jeopardised.

1.4 Challenges and Issues

The current slowdown in the world economy, which was compounded by the September 11 attack, remains a major threat to Samoa's economic stability.

- As a small and open economy, Samoa depends heavily on export and import of goods and services for economic development. World economic slowdown however will mean a drop in export earnings thereby hurting the local farmers, fishermen, manufacturers and all exporters in general.
- Secondly, the worsening world demand will almost certainly force the prices of developing country exports down and this is likely to impact negatively on the prices for Samoa's exports such as fresh fish, copra and coconut oil.
- Thirdly, there could be a drop in remittances as investors in developed countries such as New Zealand, Australia and the US, scale back investments as a result of poor returns. This will affect Samoans living abroad, who may find it difficult to obtain or retain jobs. Fourthly, tourism earnings will most likely drop as travelers refrain from traveling for fear of further terrorist attacks.

Such an uncertain climate presents a real risk for Samoa if the slowdown continues for a lengthy period. In response to such uncertainty, it is important that the government maintains and sustains the pace of reforms in order that the appropriate policies are put

in place. A sound macroeconomic framework and development policies ought to be established to improve the economy's resilience against such external shocks.

1.5 Economic Development Strategies

Prior to 1995, the approach to national planning was essentially centralised with comprehensive 5 year development plans that covered practically all sectors of the economy. However in 1995 government adopted a more strategic approach resulting in the publication of the 1996-97 Statement of Economic Strategy (SES) which replaced the long-term comprehensive development plans. The SES was considered more focused and formulated in a more consultative fashion. Hence there was a lot more community ownership of the SES compared to the comprehensive development plans. The 1998-99 SES was the second in the series followed by the 2000-01 SES.
During the preparation of the current strategy statement, the stakeholders through the consultation process, considered it appropriate to re-name the document as the Strategy for the Development of Samoa (SDS). The new title was considered more appropriate as it encapsulates all the elements of the development agenda and not just the economic aspects as in the SES.

The 2002-2004 Strategy for the Development of Samoa clearly identifies the nine key areas that will be closely pursued in the next three years. These have not changed since the first SES and include:

1. Maintaining a stable macroeconomic framework
2. Improve Education Standards
3. Improve Private Sector Development and Employment Creation
4. Enhance Agricultural Opportunities
5. Strengthen Social Structure
6. Improve Infrastructure and Services
7. Improve Opportunities for Tourism Industry
8. Enhance Public Sector Efficiency

1.5.1 Stable Macroeconomic Framework

Maintaining a stable macro economic framework is a pre-condition for achieving the ultimate goal of raising the quality of life for every Samoan. The development of education, health, infrastructure and all government-provided services will be severely jeopardised if economic activity stagnates. Macroeconomic stability implies private sector growth, which in turn means employment opportunities are being created. The Government will continue to pursue responsible fiscal policies through containing expenditures and reallocating resources to high priority developments. On the revenue side, revenue generation will be closely monitored with consideration of raising revenue through improved efficiency in tax and tariff administration as well as consideration of broadening the tax base.

Responsible fiscal policies will provide the platform for monetary policies to support private sector growth through the provision of increased credit. The monetary policies will aim at maintaining targets of low inflation and adequate credit availability to the private sector. The exchange rate policies will be closely monitored to ensure the exchange rate remains competitive to facilitate trade.

1.5.2. Private Sector Development

The private sector is the engine for growth; therefore creating the enabling environment within which the private sector prospers is a key strategy. A growing private sector means job opportunities will be created which in turn means the government can collect more revenue in terms of income and company taxes. The enabling environment will be established through accommodative monetary policies to ensure sufficient credit is available for private sector development. The supporting infrastructural services in terms of electricity, water, telecommunication including internet connections, and transportation will continue to be developed. Industrial development will continue through putting in place transparent and simplified processes. Sports has emerged to have great potential for employment creation in addition to realising the talents and abilities of sports people and will therefore be nurtured and developed.

1.5.3. Agricultural development

Agriculture plays an important role in the Samoan economy with at least two-thirds of households reliant on a mixture of subsistence and cash income. Samoa retains a highly agricultural society and economy Fisheries exports have emerged as the leading export commodity. In 1989, more than 70% of the economically active population of 55,967 were employed in the agriculture, fishery, and forestry sectors. An estimated 72% of 15,474 rural households are active to some degree in agriculture, with 19% producing for home consumption only and 47% producing mainly for home consumption. About 90% of **village households** maintain mixed livestock enterprises comprising of mainly pigs and chickens with some having cattle, horses and goats. The cattle population has increased to 30,000 heads representing a 1% increase from the 1999 Census. The low increase is due to the high demand for beef for traditional ceremonies and a low increase of breeding stock. Commercial agricultural production, including coconut products, cocoa and taro is estimated to account for 14% of GDP (1994), and 17% (including fisheries) of total GDP in 1998.

However, agriculture and the economy are highly vulnerable to the potentially destabilizing impacts of external shocks as well as natural disasters. The taro leaf blight outbreak in 1993 and the introduction of the African snail in 1995 was catastrophic, destroying Samoa's major export crop taro and others. The challenge therefore is to revive village agriculture through initiatives to redevelop traditional crops as well as encouraging diversification. Facilitating the development of the fishing industry through the provision of an appropriate policy environment and supporting infrastructure has and will be further intensified. The management of the Ministry of Agriculture, Forestry and Fisheries is being strengthened to provide the policy and strategic oversight framework.
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The inherent uncertainty of agricultural production affects export earnings. In this regard there is a push towards diversification of cash crops so that the country does not become too dependent on a few crops for subsistence needs and for export earnings.

The contribution of agriculture to GDP has declined since 1995 and continued to 1999 mainly as the result of the combined effect of the cyclone damages and the taro leaf blight. . By contrast fisheries has been increasing its contribution to GDP rising from 4.3 percent in 1994 to 6.2 percent in the first half of 1999. This remarkable improvement in the performance of fisheries has been due to the rapid growth of commercial fisheries, mainly for the export market, as a result of private sector investment. In 2000, agricultural exports of approximately US$10.4 million represented 63% of the country's export earnings yet the allocation of investment in the sector was less than 5%.

A concern is the depleting inshore fish stocks through over fishing and the use of exploitative methods, which has led to the introduction of fresh water fish farming of Tilapia (Oreochromis

niloticus) to reduce pressure on the inshore fish stock and as an alternative source of protein for the rural communities, and generate income and employment.

Offshore landings have significantly increased mainly due to the tuna industry. This has been mostly sold to overseas markets. Exported fish increased from 212 metric tons (2% of export earning share) in 1995 to 4,408 metric tons (47% of export earnings) in 1998 The industry is lucrative, but requires `considerable initial working capital which is often beyond the scope of most rural households.

The revitalisation of the village economy continues to be a key element of Samoa's development strategy. The post cyclone/taro blight period saw a diversification of the staple food base as well as income generation activities at village level through the development of cottage industries, small scale tourism activities and agro-processing.. The Government subsidizes the development and maintenance of Plantation access roads.

The development of the village economy through a partnership involving Government, and civil society will bring greater prosperity to the communities and also ensure that the rural sector participates in and receives the benefits of the national development efforts.

1.5.3.1. Key Issues and Challenges

Around 43 percent of the land is classified as arable and three-quarters of the population still depend on the land and the sea to provide their main and/or supplementary source of income. However Samoa is ecologically fragile and vulnerable to environmental degradation and to the impact of cyclones. It is estimated that over 30 percent of agricultural production is carried out in areas with severe soil limitation, and steeper slopes are being cleared, increasing the vulnerability to erosion.

- Maintaining food security through a balance in the dual strategy of subsistence and export production
- Reducing vulnerability to external shocks, such as fluctuating commodity prices, exchange rate movements and changes in economic policies of Samoa's trading partners and also natural disasters;
- Encourage more diversification into value added agro-processing
- Further development of subsistence and commercial fisheries together with sustainable management practices;
- Effective strategies to revive the rural economy; with due consideration of economic, social and environmental systems;
- A distinction must be drawn between ~~the~~ servicing the needs of the commercial and subsistence sectors and, concomitantly, between economic and social objectives in providing extension and other services to farmers;
- The approach to economic development of the agricultural sub-sector should be to focus on the private sector and those already successful in commercial agriculture. Private sector entrepreneurs will provide leadership and become the 'engine for growth' in agriculture; Government, through MAFFM, has an important role in extension, research, regulation and policy development.
- The reform process is establishing an environment that is conducive to commercial agricultural development. The taxing of the sector should, however, be revisited, with removal of taxes on inputs, but the imposition of income tax;
- Government to divest itself of the various commercial activities in which it is involved, such as beef cattle farming, STEC, SLC, the Agriculture Store and the Oilseed Crushing Company Limited;
- Land for commercial agricultural development can be made available through further divestment of STEC and SLC

1.5.3.2. The Way Forward

- Agriculture will continue to be an important sector of the Samoan economy. Village agriculture will continue to be promoted as it provides food security and support to the agro-based industries such as coconut cream, oil and desiccated coconut which have been major export products in the past years.
- The commercial development of many of the crops traditionally farmed in Samoa, further encouragement of commercial livestock production and support of commercial fisheries will support more processing and added value of products on island for export and will generate employment opportunities in this sector.
- The ongoing institutional strengthening of both public agencies and private operations in this sector especially in the areas of extension services support, production and quality control and marketing will in the medium term greatly assist in the development of agriculture and agrobased industries in Samoa. There is a need to develop a specific agricultural sector policy.
- The government recognises that attempts to raise the level of efficiency of the traditional farming system must focus on the provision of effective information dissemination and feedback from the farming communities therefore efforts to focus on improvement in this area specifically on marketing will be a viable option in spearheading production and food security.
- Efforts need to be focused on the achievement of high standards for existing export commodities through the application of strict quarantine and quality control measures.

1.5.4. Infrastructural development

Infrastructural development is seen as critical for private sector development. But more importantly the provision of services such as water, electricity, road transport, shipping services and telephone communication, is considered an effective vehicle for redistribution of national wealth. Consistent with the theme of ensuring that the community shares the benefits of development, infrastructure development will be rigorously pursued to ensure total coverage. Currently the whole country is served by tar-sealed road systems, there is a well developed shipping service linking both islands. Eighty percent of the country has electricity and access to potable water. Telephone systems extend to the rural areas.

1.5.5. Sustainable Tourism Development

Tourism offers great potential for foreign exchange and employment creation throughout the economy, both in resorts and in tourist related services. Tourism development however, must be consistent with Samoan culture and traditions.

During the 1990s, there was evidence of a significant sectorial shift in the contributions of the services sector to GDP. Since 1994 tourism earnings have been the largest source of foreign exchange. Tourism receipts have grown fro 5% of GDP in the eighties to 15% in the late nineties.

A key feature of tourism development will be the finalisation of the 2002-06 Tourism Development Plan. The plan will highlight the framework for tourism development for the next five years. In the marketing area, efforts will concentrate on key markets and providing a clear and coordinated image for the country. Training in the hospitality area will be aggressively pursued to ensure skills are available to support and promote tourist related services. The management of the Samoa Visitors Bureau will be strengthened in order that the implementation of the Tourism Plan is made effective and efficient.

1.5.6. Public sector efficiency

The primary focus of the public sector reform is to enhance the efficiency and effectiveness of the public sector while giving due regard to the pillars of good governance namely transparency and accountability.

As part of this process, the roles and functions of departments will continue to be re-defined to concentrate on core functions. Moreover, departments will have to refine their corporate and management plans to support the performance oriented budget approach. Additionally, service charters will become a key feature of departmental service delivery. The enactment of a number of legislation including the Public Finance Management Act 2001 and the Companies Act 2001 form the legal requirement for transparency and accountability

In the implementation of their functions, government departments and agencies are required to consult widely with stakeholders so that service delivery meets public expectation.

Associated with the redefinition of the government's role are the strategies for privatisation and corporatisation of state-owned enterprises. These will be closely implemented in the next three years. The Public Bodies (Performance and Accountability) Bill is expected to impose commercial discipline in the management of state owned enterprises.

1.5.7. Improving Education Standards

Currently, there is no gender disparity in enrolment rates. Education at primary level is compulsory but not free. The provision of good quality and relevant education services is a key strategy to be pursued. All children have equal access to good education. Samoa is not endowed with many natural resources and therefore an educated and skilled labour force is considered the most valuable resource for its development. The availability of skilled human resource to meet the demands of the private sector is a desired long-term goal.

Raising the quality of teaching is a central element of this strategy. Teachers will be provided the opportunity to pursue a formal degree at the National University of Samoa and the University of the South Pacific. In-service training and professional development programs will continue. These are expected to elevate teacher status, qualification and professional skills leading to improved service delivery in education. Furthermore curriculum and teaching materials will continue to be developed and improved in order that students have access to quality and relevant teaching resources. Improvement of education facilities is another key element of education development. Due to the high pupil/teacher ratio in the urban areas, the development of school facilities around the capital Apia is being given priority. The project entails renovating school buildings and associated facilities so that pupils can operate in a sound-learning environment. Institutional strengthening of the Education Department will also continue. The availability of sound management capacity, appropriate structures and supporting systems are essential elements for the efficient management and oversight of education development nationwide. Closer cooperation with the private sector including the church is greatly encouraged.

1.5.8. Improving Health Standards

A healthy labour force is a pre-requisite for effective and efficient management of the economy. Government will maintain priority support to the health sector to ensure equal

access to health services by all households. Currently Samoa has health indicators equivalent to those of some developed countries

Health promotion and health prevention remains a key strategic focus. The Government will continue to develop and intensify health promotion and education policies and programs. Primary health care services will be improved through strengthening primary and secondary prevention and treatment programs for non-communicable diseases (NCD).

Health services at the community level will be closely targeted. An integrated community health service will be established. The efficiency and effectiveness of primary, secondary and promotive service delivery at the community level will be improved through strengthening planning, management and resource utilisation within the geographic areas of the service. A mobile clinic is already in service to better serve the rural communities.

Health facilities will continue to be upgraded to enable an efficient and effective delivery of health services. Existing facilities will be refurbished to improve operational efficiency. A maintenance plan to ensure the long-term sustainability of these facilities will form part of this strategy. Strengthening the partnership with the private sector to ensure the best health service is provided to the public will be further pursued. Furthermore the management of the Health Department is currently being strengthened.

1.5.9. Strengthening social structure

It is important for the stability of a society and for sustained economic growth that social issues are not overlooked. Rising social problems can undermine economic growth strategies. By the same token, minimizing social problems complements and helps to ensure sustained growth. Therefore addressing social issues will be given priority attention.

It is a fact that social structures provide a valuable safety net and the Samoan culture is recognised as a key factor in maintaining social harmony in the Samoan society. Enhancing the effectiveness of the different institutions of the social structure is critical to the restoration of law and order in the Samoan community.

1.6 Challenges and Issues

- The reform program began in 1994 and significant progress has been achieved. The positive macroeconomic performance achieved in the past five years, suggests that the reform program is working. However the reform agenda has a long way to go yet and there remains room for improvement. Samoa cannot afford to be complacent. Consolidation of strategies already implemented must continue so that the adverse impact of both internal and external shocks can be minimised.
- Capacity constraints remain a real challenge. Both the private and public sectors demand a wide range of skills. Training must be continuous so that a steady stream of skills is ensured.
- The implementation of the strategies enunciated in the current Strategy for the Development of Samoa is a challenge. Successful implementation will provide opportunities in which everyone will be able to realise their talents and their aspirations, and be open to a choice of opportunities for an improved quality of life.
- Systematic appraisal procedures for public sector development projects did not exist before 1997 and 1998. Any such attempt was usually fragmented and uncoordinated. Hence, obvious and potential environmental impacts of major land-based public

sector projects were either overlooked, inadequately assessed, or ignored altogether. Draft Environment Impact Assessment regulations were formulated by the DLSE in 1998.These regulations basically require all proposed developments, to be subject to Environmental Impact Assessments. The regulations built upon the incorporation of environmental considerations throughout all stages of the project cycle (from planning to implementation). Although still in draft form, there has been strong political support to see these regulations implemented

1.7 Trade liberalisation

In 1998, the government undertook substantial economic reforms to enhance the development of the economy through the introduction of trade liberalisation policies. The aims of the policies were to develop the private sector as the engine to economic growth and included the following

- Promotion of trade in goods through exports
- Promotion of trade in services through tourism, liberalisation of the financial markets and privatisation of the telecommunications sector
- Increased access to international market
- Creating an enabling environment for foreign investment through revised legislation (Foreign Investment Act 2000)
- Increased capacity of local producers
- Enhanced infrastructural support.
- Reduced tariffs

While foreign investment is encouraged, the government has also instituted policies to promote small and medium enterprises that serve the local market as they represent the mass of economic activity.

1.7.1 Issues and challenges

As the global trading environment becomes increasingly integrated, the challenges faced by Samoa as it prepares for WTO accession include; dealing with the erosion of preferential markets, meeting the costs of accession and being a member of WTO, trade diversification including the development of niche markets, minimisation of social costs and consideration of measures which could lead to compromised traditional practices in order to produce exportable products or services.

- Samoa as a Least Developed Country has received technical assistance under the Integrated Framework for Technical Assistance to the LDCs in preparation for accession
- Samoa along with other Pacific countries have made significant progress in enhancing regional economic integration, redefining relationships with each other and looking at a replacement for SPARTECA. Trade with Asian countries has also expanded in the mid 1990s.
- Taking advantage of niche markets is not new in Samoa. The Samoa business community has worked hard to identify the advantage of such opportunities in areas such as ecotourism, exports of high quality fish and local product exports to Samoans living overseas. The fisheries sector has experienced significant growth but in undertaking this expansion there has been a need to introduce stricter laws and regulations relating to safety at seas and ensuring the quality of the catch.
- The Government has concentrated its efforts on macroeconomic reforms, which are essential for the enhancement of export competitiveness.
- A regional trade agreement to set up the Pacific Island Free Trade Agreement (PICTA) was signed in August 2001.

1.8 Sustainable human development

1.8.1 Globalisation

Globalisation is reshaping the opportunities and risks for human development and poverty reduction and how well countries do this will not only depend on their ability to formulate proactive policies conducive to seizing opportunities emerging from globalisation but also on their commitment for stronger governance and cooperation.

A key aspect of globalisation has been the increasing commitment by countries to take joint responsibility and action on a wide range of issues. In response to the comprehensive rights based development agenda as laid out by the United Nations through a series of world summits and global conferences, Samoa has worked hard to implement many of the targets and recommendations. These have been supplemented by additional and complementary commitments at the regional level such as the free trade agreement, the US Fisheries Treaty and a number of environmental treaties focusing attention on the fragile nature of small island countries. In the area of public sector accountability, Samoa along with other Pacific island countries are assessed against eight principles of accountability.

In terms of the 8 Millennium Development Goals, Samoa is well advanced to meeting these and would need to refine and adjust them if they were to make sense in the context of the current state of its development.

1.8.2. Poverty Reduction

On a macro scale the per capita GDP, which has been traditionally used as the measure of the standard of living, has increased to around USD1,200 from USD760 in 1993. On a global scale the human development achievements based on the vulnerability index continues to place Samoa under the United Nations category of a Least Developed Country. The shortcomings of the GDP per capita has led to the increasing use of the Human Development Index which is constructed from a number of economic, health and education achievement indicators including life expectancy, real per capita GDP, adult literacy rate and combined enrolment ratio. In 1994 Samoa ranked 88 out of 174 countries in the Human Development Index. The index measure was slightly less than Fiji, but well above Papua New Guinea. The strong social indicators such as life expectancy, literacy and access to water, health and education services have lifted the global ranking of Samoa in contrast to the GDP per capita measure

The main characteristics of poverty as they apply in Samoa using available statistics are discussed as follows:

Poverty of Income

Income poverty defines the lack of sufficient income to meet minimum consumption needs. Relative poverty means living in a considerably worse way relative to other people in the same society. These poverty concepts are often analysed based on National household income surveys, which attempt to measure household or individual income or the extent of income inequality. The effectiveness of these income-based measures is limited on account of the special characteristics that are also important for livelihood. In the case of Samoa such characteristics include the role of subsistence production, remittances, operations in the cash and non-cash economy and an understanding of the Samoan traditions and culture.

As part of the UNDP Poverty Strategy Initiatives, the latest empirical study to measure poverty in Samoa, was conducted through the Department of Statistics using the results of the 1997 Household Income Survey. The study examined absolute poverty using food and basic need poverty lines estimates as well as relative poverty assessed in terms of the

characteristics of the poorest 20 percent of sample households. There has been some controversy with the findings of the study on sampling methods such that Government has yet to decide on an acceptable benchmark for poverty measurement. The Government plans to undertake a poverty-focused survey in 2002 as part of the development of a comprehensive poverty strategy.

Food Poverty Line (FPL)

The FPL identifies households, which cannot afford a basic minimum nutritionally adequate and palatable diet. Using the data from the 1997 Samoa Household Income and Expenditure Survey the Food Poverty Line was estimated through the UNDP funded study at ST152.43 representing a weekly diet for a family of four adults and three children developed by the Nutrition Centre of the Health Department. The results showed that around 50 percent of households did not have sufficient daily food expenditure to meet the dietary requirements

Basic Need Poverty Line (BNPL)

BNPL identifies households, which cannot afford the basic minimum nutritionally adequate and palatable diet as well as essentials for life transport, energy (electricity, kerosene and wood), health, education, water, and housing. Using data from the 1997 Samoa Household Income and Expenditure Survey the Basic Needs Poverty Line was estimated at ST189.27 representing a weekly minimum expenditure for a diet for a family of four adults and three children as well as the minimum costs for transport, energy, health, education, water and housing. The results found that one in three households could not properly meet their basic needs and were poor relative to the estimated BNPL.

Relative poverty

The characteristics of the poorest households were analyzed using standardized household expenditure data. The analysis assumes that household expenditure is for the equal benefit of all household members, which may not necessarily be so in reality. The results show a median total daily expenditure per adult equivalent from standardized data of ST6.12. The lowest 20 percent of households spent around ST3.39 per day for each adult male equivalent.

Poverty of Opportunities

Poverty of Opportunity is defined as the inability of people to lead the kinds of lives they aspire to and is based on an underlying idea that more people are denied basic human opportunities than are denied a minimum income. Poverty of Opportunity can be assessed in terms of education, health and employment, however, poverty of opportunity can also involve the denial of opportunities in material well-being, access to markets, job security, political and social freedoms and other dimensions that are not easy to quantify.

On account of the peculiar Samoan culture and social practices, the broader concept of poverty of opportunity include the level of access to and standards of education and health services, lack of economic assets, social exclusion and political marginalisation, is considered a more appropriate description of poverty for Samoa.

The possible potential areas, which aggravate vulnerability to poverty in Samoa, are linked to the following economic, political, cultural and vulnerability factors.

(i) A narrow economic base and geographic isolation from markets
(ii) Customary land tenure system with no clear registration system in place hinder development of customary lands particularly in rural areas, however, it also ensures that there is access to land for every member of the extended family.

(iii) Customary owned land cannot be used as collateral for financing.
(iv) The onerous social and ceremonial obligations in the extended family, church and village context of the Faa-Samoa could aggravate poverty of income particularly in the rural areas,
(v) Vulnerability of agricultural crops to pests and diseases as shown by the taro blight could aggravate poverty in the agro-based villages in the rural areas,
(vi) Vulnerability to cyclones and other natural disasters like flooding is significant given the concentration of settlements and traditional villages are located in exposed coastal areas.
(vii) Urban drift
(viii) Lack of paid employment opportunities
(ix) Lack of access to credit
(x) Geographical isolation from the mainly centralised services

The growth of the formal economy has been reflected in a growing concentration of income since the early 1970s. However, where growth is achieved on a sustained basis it has been argued that generally poverty will be reduced and most people will benefit from a higher standard of living. Seen in these terms, the growing income concentration from 1972 to 1997 is related to the growth of the formal and urban sector in Samoa and is an important condition for a higher general standard of living.

The wage-earning sector makes up less than half of those who are classified as economically active. In 1996 the national average wage in the formal sector was about SAT$5,000, with 60 percent of wage earners earning less than the average and around 86 percent earning less than SAT$10,000 (UNDP 1998). Urban villages are much more likely to have a waged worker compared with peri-urban and rural villages. Villages studies have shown that 78 percent of families in an urban village had at least one waged worker compared with 37 percent in a peri-urban village and 33 percent in rural villages (Fairbairn-Dunlop 1991). Within the traditional domain both pastors and local entrepreneurs have higher economic standing. However entrepreneurs must redistribute considerable income to traditional causes to maintain their ability to operate effectively as an entrepreneur.

The Government has demonstrated a strong commitment to social development. This is reflected in particular in the priority given to education, health and basic infrastructure. However as the formal economy continues to grow there will continue to be growing social pressures with urban drift possibly leading to higher crime and environmental pressures and a weakening of traditional cultural norms.

1.8.2.1. Key issues and challenges

The Government should now look to address the following issues.

- Definition of poverty at national level; the distribution of poverty nationwide; the identification of most vulnerable groups in the economy; develop national database for policy formulation and monitoring of poverty over time,
- Clear linkages of poverty alleviation programmes/activities to outputs and outcomes sought,
- Further refine a strategy for poverty alleviation and equitable distribution of benefits from the reforms,
- Maintaining social fabric of Samoan culture and traditional safety nets
- Strengthen and support the role of organizations that work in the communities in service delivery

1.8.2.2 . The Way forward

Whilst there are no specifically designed poverty alleviation policies, the Samoan Government has been aggressively pursuing major rural development initiatives to improve access to and quality of infrastructure and services in education and health. The current Samoa Development Strategy (SDS) also reflects the strong focus on the improvement of the standard of living including through a revitalised rural village economy. Overseas development assistance re-emphasizes the focus on priority areas articulated in the SDS.

It will be important for economic growth to continue and for government to develop and implement policies that support growth while at the same time establish a firm basis for assisting the most vulnerable groups. Improving basic education and making it easier for the private sector to operate in a non-distortive economic environment are critical. The creation of employment opportunities is a priority concern . This can only be effectively done by the private sector. In this respect Government will need to continue to create the conditions under which the private sector will thrive on a sustained basis creating jobs and incomes. Specific programmes aimed directly at poverty alleviation should be pursued. Well-targeted intervention by the UN agencies to support these programmes will be crucial over the coming years.

1.9. Population and Demography

1.9.1 Context:

Samoa's population in 1991 was 161,296. The 2001 population census preliminary results recorded a population of 174,140. This indicates that after a period of ten years, the population increased by only 8%. Table 1 presents the preliminary results of the 2001 census.

The preliminary results show a male:female ratio of 100:92 in 2001 compared to 100:90 in 1991. A notable feature of the 2001 census, is the shift in the population of the four major districts. In 1991 the population of North-West Upolu was 39,046 but increased to 52,412 in 2001 representing an increase of 34%. For the same period, the population of Savaii dropped by 7%. The Apia Urban Area population increased by 8% with the Rest of Upolu essentially unchanged. The dramatic increase in the population of North-west Upolu is explained by the significant occupation of newly settled areas such as Vaitele located just outside the boundary of Apia Urban Area. The drop in the population of Savaii, suggests that there has been a significant resettlement of Savaii people in search of improved education and health facilities and better employment opportunities.

Table 2 – Population of Samoa

	1991			2001		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
APIA URBAN AREA(AUA)	18,396	17.093	**35,489**	19,724	18,833	**38,557**
NORTH WEST UPOLU (NWU)	20,498	18,548	**39,046**	27,374	25,038	**52,412**
REST OF UPOLU (ROU)	21,991	19,722	**41,713**	21,652	19,693	**41,345**
SAVAII	23,714	21,334	**45,048**	21,863	19,963	**41,826**

SAMOA	**84,599**	**76,697**	**161,296**	**90,613**	**83,527**	**174,140**

The absence of detailed final results of the 2001 census limits the degree one can analyze the population developments between 1991 and 2001. However, it is not impossible to draw out the major population issues from the preliminary results as well as the National Population Policy recently approved by the Cabinet Development Committee. (CDC).

1.9.2 National Population Policy (NPP):

The development of the NPP is a response to the growing concerns of the increasing population and its socio-economic impacts. Its overriding objective is to highlight population issues and concerns and raise awareness so that these issues and concerns are taken on board in national planning. Achieving sound and sustainable population indicators that are consistent with available resources is the ultimate goal of the policy. The policy therefore provides a process for discussing and monitoring population issues.

The formulation of the NPP was based mainly on historical data prior to the 2001 census. The policy therefore has not benefited from the updated results of the 2001 census. Notwithstanding that, it is expected that Samoa's population structure and associated issues would remain largely the same between 1991 and 2001. **Some of the key issues are discussed below**.

(i) Rural-urban drift

It is evident from the 2001 census preliminary results, that there has been a massive movement away from rural areas to the urban areas. Table 2 indicates that over 52% of the total population reside in urban Apia and north-west Upolu. The high concentration in these areas places undue pressure for the provision of education and health services as well as infrastructural services such as electricity, water and telephone.

(ii) Youthful population

Prior to 2001, Samoa's population structure was such that over 40% of the population is under 15 years of age. This was largely due to improved infant mortality rates and migration. The young population draws very heavily on the national budget for the provision of education and health services.

(iii) Increasing elderly population

With improved health care, a greater percentage of the population is likely to live longer and therefore the elderly population rises. With the government providing free medical treatment and transportation as well as social security benefits under the Senior Citizen's Pension Scheme, a continued increase in the elderly population will become a real budget burden.

(iv) Migration

Samoa loses much of its investment in human resource development through emigration, particularly as migration becomes more selective and targeted in favour of the professional and skilled. A quota of up to 1100 new migrants enter New Zealand each year, although migration for humanitarian reasons usually raise this number to around 2,000 per year. Second, migration directly hits the nations workforce - the largest group of migrants is in the 15-24 age group, with male/female ratios roughly even. The high dependency ratios, and the atypical family composition, this pattern of migration generates (ie families of elderly and very young) places an economic and social burden

on those `left behind'. Women and children and youth may have to work longer hours to supplement the family budgets, and fulfill the families' community obligations.

1.9.3. Challenges and Issues:

- Perhaps the key challenge is finding the Government agency that can effectively coordinate the implementation of the policy. The adoption of the NPP is a major positive step in discussing population issues. The policy now provides a platform and forum for discussing population related issues. Because of the multi-faceted nature of population issues, it is difficult to identify any one department to be responsible for these. Currently, the Health department is responsible for coordinating population issues and have received formal endorsement to continue to function in that capacity and will be supported by a multisectoral advisory committee. Given the diverse nature of population issues, establishing a wide-ranging committee will be valuable for a broad-based discussion of population issues.
- The unavailability of reliable and timely data to analyse population issues is a key constraint. In-depth analysis cannot be carried out without the necessary data. Without that analysis the formulation of proactive strategies and policies to address emerging population concerns is significantly compromised. As noted from Table 2, the inter-census period has been ten years (i.e. 1991-2001). This has greatly limited the degree one can analyse population issues and concerns within the ten year period. For instance the provision of services for the fast growing areas could have been better prepared if the data was available in a more timely fashion.
- There are also manpower and capacity constraints. The number of staff in the Statistics Department is insufficient to support the need for generation of data.. External short term training and on the job training have produced good results but a lot more effort needs to be directed at improving the competence and skills of the staff.

1.10. Governance

The Government has since the early nineties committed itself to the promotion of good governance. The introduction of performance budgeting to bring about greater efficiency and accountability in the allocation and use of public funds, the creation of a level playing field for public and private sector enterprises and the setting up of consultative processes between the Government and the business community and civil society to jointly formulate national economic and social policies and strategies as well as the reform of the public sector are all examples of the government striving to improve its governance framework.

There is now greater awareness of the importance of maintaining good governance in facilitating economic growth, in maintaining socio-political stability and in reinforcing the confidence of the donor community in the effective management by Samoa of its aid resources.

1.11 Cultural and heritage resources

1.11.1 The Samoan Culture

Past as well as the 2002-2004 Strategy for the Development of Samoa recognises that the *faa-Samoa* or Samoan culture is a key factor in achieving and maintaining social harmony within the Samoan society. It is a valuable social security system that provides cohesion in the community.

The Village Council or "*Pulega a Alii ma Faipule"* is the paramount hierarchy in the Samoan structure which membership consists of *matai* or titled persons and includes both men and women. It is the decision making body and effectively maintains law and order within the community. The *"Aumaga"* or untitled men implement the decisions of the Council. Similarly the Women's Council or "*Faletua ma Tausi"* plays a vital role in the implementation of decision making in key areas of their domain namely health, education and family welfare.

Religion is deeply rooted in the Faa-Samoa as reflected in the Constitution. The position of the church in the community can be quite influential as evident on a number of occasions when the church has reversed decisions of the village council as a result of intervention. Unfortunately there have also been cases where culture and religion clash. However the potential influential standing and the extensive outreach of the church within the community makes it a valuable vehicle to drive pro-harmony strategies.

The family nucleus is a key resource for promoting social stability. It is the fundamental platform for social cohesion and is regarded as the initial learning environment for any Samoan child. The role of the parents in taking care of the welfare of the family and providing support to the children is critical. A stable family is more likely to uphold cultural, religious and family values, which are prerequisites for social harmony, hence it is important to ensure that family values are reinforced and strengthened.

1.11.2 Heritage sites

There are not many known and developed historical sites despite references to the existence of a potentially high number of them. Historically the failure to identify them earlier and conserve them may have led to the non-discovery of these sites. The pressure of development may have led to some sites being converted into investment instead of conserving them. With the exception of a few, the historical sites that are now developed have emerged as a result of environment related conservation efforts and tourist promotion initiatives. Perhaps the establishment of an agency directly responsible for cultural discovery could trigger renewed interest in discovering further historical sites.

The development of historical sites for environment conservation and tourist promotion purposes has to a large extent been the basis for continued maintenance of these sites. With the rise in the number of cruise ships visiting the Apia port, the development of existing and new historical sites can be a sound marketing strategy.

1.11.3 Challenges and issues

- On the cultural side, maintaining the strengths of the Samoan culture is considered critical for continued social cohesion and stability. Inevitably the Samoan traditions and cultural values will go through a process of change partly as a result of social and economic pressures. But Samoa cannot afford to lose its culture because the social and economic cost of a disintegrating system is enormous as seen in other Pacific island economies. Measures should be put in place to enhance the role of the village council as stipulated in the Village Fono Act 1990. There must be a platform where the judiciary system works hand in hand with the operation of the village council because there are mutual benefits in the two working together. The National University of Samoa has a Samoan studies faculty, which provides the opportunity for anyone to study and appreciate the Samoan culture more. The government through whatever means – financial and manpower must support the efforts by the National University.

- The discovery of new historical sites will need to be looked at carefully. Whilst there is value in terms of cultural significance as well as the possibility of raising rural incomes through tourism, establishment and maintenance costs must be closely looked into.

CHAPTER 2: HUMAN RESOURCES

2.0 Context

Although health and education have always been priority areas in national development, it was not until the 1990s that public sector investment shifted from economic infrastructure to the social sectors**.** Over 20% of the population are in the age group 15-24 years and they constitute of people that do not have adequate or appropriate skills for the limited wage opportunities available. Existing non-formal education training programmes cannot cope with the swell in numbers each year nor are they adequately resourced to cater for the need. Growing urbanisation has led to overcrowding, environmental degradation and growing inequities. The government in recognition of the situation began in 1999 a programme of infrastructural development and upgrading of schools and educational services in the periurban areas in order to stem the flow of people moving to get access to better education services.

2.1 Education and training

Education development is a key strategic outcome pursued in the past economic strategies as well as in the 2002-04 Strategy for the Development of Samoa (SDS). The government recognises that Samoa does not possess much natural resources except its people. Therefore investment in education is crucial in order that the workforce is equipped with the appropriate skills required by both the private and public sectors. The significant resources allocated to the education sector demonstrate this. The budget allocation for education services as a percentage of total government budget increased from 19% in 1992/93 to 37.3% in 2000/01.

Samoa recently upgraded the Technical institute into a full-fledged Polytechnic and the University Preparatory Year programme into the National University of Samoa offering full diploma and degree qualifications in a number of vocational and academic programmes. Government continues to provide support to private vocational training centres with the aim of equipping school leavers with skills that are marketable in the private sector. Nationwide programmes have been implemented at both primary and secondary levels to ensure that there is equitable access to quality and relevant education. A major component of the public sector programme is institutional strengthening to enable public service agencies to focus on core functions of policy development, financial sustainability and cost effective service delivery.

Education development for the next few years will focus on improving teacher quality and standards, revising and upgrading curriculum and teaching materials as well as upgrading the physical infrastructure. Major projects are already underway to achieve these objectives.

2.2 Employment

Table 3 provides data on formal employment, and it is apparent that significant growth in the number employed has occurred. From 21,115 in 1994, formal employment has increased to about 25,015 in 2000 according to data from the National Provident Fund. This increase in formal employment translates to growth averaging 2.9% percent per annum, or an average increase of about 650 per annum in employment.

A key feature of employment structure is the shift in favour of more formal employment. Given the significant gain in percentage of the labour force being engaged in formal employment, informal employment as a result has declined commensurately from 40,450

in 1991 (census) to an estimated 25,750 in 1999. As previously noted, informal employment includes the self-employed, unpaid family workers (working in family owned establishments), and unpaid workers engaged in agriculture, fishing and other activities producing mainly for home consumption (non-money economy).

Table 3 – formal employment

	1994	1995	1996	1997	1998	1999	2000
Total Number of People Employed							
Agriculture and fishing	1,244	1,142	1,170	1,115	1,075	1,022	568
Food manufacturing	542	602	625	641	712	759	726
Other manufacturing	2,270	2,625	4,040	3,421	2,348	2,392	2,385
Electricity and water	387	838	1,135	626	533	487	434
Construction	911	869	1,091	1,166	634	581	730
Commerce	963	971	1,029	1,168	1,213	1,224	1,223
Accommodation/restaurants	757	817	1,007	924	1,041	1,117	1,071
Transport/communication	1,715	1,585	1,600	1,720	1,794	1,917	2,285
Finance and business services	862	865	922	947	1,016	1,066	1,132
Public administration (***)	8,980	9,046	9,031	8,970	9,016	9,217	11,333
Education (***)	1,134	1,172	1,194	1,234	1,320	1,332	1,457
Personal services	524	473	451	471	514	602	509
Other services	826	1,200	1,293	1,439	1,463	1,346	1,162
All industries	**21,115**	**22,205**	**24,588**	**23,842**	**22,679**	**23,062**	**25,015**
Total Number of People Employed	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Primary Sector	1,244	1,142	1,170	1,115	1,075	1,022	568
Secondary Sector	4,110	4,934	6,890	5,855	4,226	4,219	4,275
Tertiary Sector	15,761	16,129	16,527	16,873	17,377	17,820	20,172
All industries	**21,115**	**22,206**	**24,588**	**23,843**	**22,678**	**23,061**	**25,014**
Sector employees as % of total Workforce							
Primary Sector	6	5	5	5	5	4	2

Secondary Sector	19	22	28	25	19	18	17
Tertiary Sector	75	73	67	71	77	77	81

SOURCE: NATIONAL PROVIDENT FUND

2.2.1 Issues and challenges

- There is a lack of adequate and timely data which hampers effective policymaking with respect to employment and training. Informed planning and policy making in public administration, education, and in industry requires accurate, timely data on employment, unemployment, entry and exit components of the labour force, and employer occupational skill and training needs. Many of these data components are either simply not available, are out-of-date, or are of questionable accuracy. Various government agencies collect employment and labour force related data, including Statistics, Labour, Education, the Public Service Commission, Immigration Office, Inland Revenue, National Provident Fund, and Treasury.
- There is a need for better coordination and collaboration in determining statistics user needs, and the most cost-effective approach to collecting, processing and reporting employment and training data.
- A recognized major constraint to generating increased growth in employment in Samoa is the scarcity of occupational skills and associated educational background of persons currently unemployed, underemployed or out of the labour force because they have become discouraged in their failed attempts to find more satisfactory jobs. Employers, both private and public, have been unanimous in pointing to the extreme difficulty they have in filling job openings requiring occupational skills above the entry level.

2.2.2 Capacity building

Strengthening the role of Women and NGOs

- In 1992, Samoa was the first country in the Pacific to ratify the Convention on the Elimination of all forms of discrimination against Women (CEDAW). Prior to that the Government had set up a Ministry of Women Affairs which functions mainly to provide policy and strategic advice and to a lesser extent welfare programmes.
- A National Policy on Women was prepared in 1999 and has been approved by Cabinet.
- The Convention on the Rights of the Child was ratified by Samoa in 1994.
- Gender awareness training workshops are an integral part of capacity building efforts by the Ministry of Women Affairs as well as other government departments and civil society.
- While the government has yet to develop a policy on Non-government organisations, it has adopted a collaborative arrangement with NGOs in terms of policy development and project administration. Where NGOs have demonstrated a comparative advantage over the government agencies, they have been assisted to ensure that they become more effective in services delivery.

People with disabilities

- An important aspect of social integration is the promotion of the full and equal participation of people with disabilities and ensure the removal of any barriers to this end

- Any form of discrimination need to be removed including lack of access to education and health services as well as employment
- There is a need to collect appropriate data on people with disabilities, as they are a crucial part of development. Emphasis should also be placed on the importance of accessible infrastructure particularly in key industries such as tourism.

2.3. The way forward

- With regards informal employment, government needs to provide timely, comprehensive data (at least on an annual basis) on all components of informal employment. In terms of the largest component of employment in the labour force, unpaid workers mainly engaged in subsistence agriculture and fishing, government needs to utilize a periodic household sample survey as a basis for making estimates of both the employed and the unemployed (possibly underemployment as well).
- Of major concern to policy makers is the large number of youth leaving school before completing secondary education (i.e., school dropouts). Only about 20 percent of those starting Year 1 advance to Year 13, the final year of secondary education. Most youth enter the labour force or engage in non-economic household responsibilities without the appropriate skills base.
- There is a need for the government to develop a policy on non-formal education as resultant programmes can be a cost effective option for school dropouts to gain productive skills.
- Special efforts will have to be focused on stimulating private investment. The level of investment must be increased if job creation objectives are to be achieved. Employment policy should entail the targeting of specific industries that have the potential for substantial, sustainable growth in employment.
- All factors considered, net out-migration of Samoan citizens (mainly to New Zealand) has been beneficial for the nation. While government should continue to support such emigration, it should also undertake a campaign to encourage the repatriation of skilled citizens who have lived abroad for an extended period and who have the knowledge and skills needed to support development of Samoa. The repatriation campaign should be a joint undertaking between government and the private sector.
- The government to effect the establishment of a National Training Authority that would provide the planning, policy formulation and coordination needed to achieve the efficient development of education and training institutions. The scope of the NTA coordination and planning assistance work should extend to adult continuing education and training and to the applied subjects program in secondary education, in both public and private institutions.
- Samoa must look to a strong post secondary education and training sector to provide the advanced vocational, technical and professional skills needed to support increased investment and higher productivity.
- With respect to capacity and quality of vocational and technical training there is a need to expand training capacity at the post secondary level to enable a greater number of persons to obtain more productive skills particularly those who do not meet entry qualifications.
- With respect to quality of training, industry has noted that many new employees lack the job skills (including work-related attitudes and values) that employers expect of job applicants who possess post-secondary training qualifications; hence the situation needs to be improved.
- There is a need to identify gaps in technical skills and expertise with NGOs and that networks be developed to build up technical skills and resources within each NGO
- Consideration of the resource limitations of the NGO community needs to be taken. Securing of an appropriate level of resource allocation is required for NGO participation to be effective. The process for channelling resources to NGOs for

development activities will have added benefit to the overall development effort through enhanced local technical capacity, increased employment opportunities and reduced demand for external technical input.

- In promoting ICT for empowerment of the poor, special attention should be given to the needs of youth and persons with disabilities during the development and implementation of projects.

CHAPTER 3: CLIMATE CHANGE

3.1 Context

The vulnerability of Samoa to the impacts of climate change and sea level rise is a serious concern because 70% of its population and infrastructure are located on low lying coastal areas (SPREP, 1994). Samoa's economy largely depends on its natural resources, which rely on good stable climatic conditions for growth and sustenance.

Much of Samoa's primary sector or agriculture relies on a climate that is characterised by sufficient sunlight, rainfall and absence of extreme events. Understanding the implications of climatic change such as sea level rise and global warming is of critical importance in Samoa's attempts to adapt to these changes. The reduction of greenhouse gases in cooperation with the rest of the world that are committed to reversing this phenomena has also been prioritised, with work already starting with inventories and policy initiatives

Samoa's climate is typical of small tropical islands, geographically isolated from big landmasses. The rainfall and humidity are usually high. Distinctive wet and dry seasons are experienced only on the leeward (north western) sides of the main islands, Savaii and Upolu. Temperatures are high and generally uniform throughout the year. Samoa experiences southeast trade winds almost all times of the year. However severe tropical cyclones occur during the summer months of December to February. Samoa is also vulnerable to anomalously long dry spells that coincide with the El Nino South Oscillation (ENSO) phenomena. These vulnerabilities are particularly exacerbated during extreme events, as evident when tropical cyclones Ofa (1990) and Val (1991) devastated Samoa causing damage estimated to be about three times the GNP (GoS/DLSE, 1999), and the dry spells that followed.

The pollution of Ambient Air Quality has become a major concern particularly in the Apia urban and industrial areas. The emission of smoke from daily incineration of rubbish and cooking in outside kitchens is a normal experience in Samoa particularly in the rural areas. Manufacturing establishments also emit contaminants from the incomplete combustion of carbon-based fuels. With the lack of any legislative controls for these emissions, any increase in the number of these sources would mean more contaminants in the air. It is apparent from the types of activities taking place in various parts of Samoa that contaminants were being emitted into the atmosphere from many sources on the islands. In the Apia urban area alone, a number of industries such as bakeries, food processing factories, timber treatment plants, diesel fuelled power plants, and landfill are contributing to the presence of soot, sulphur dioxides, oxides of nitrogen, hydrocarbons, carbon monoxide and lead etc in Samoa. The contribution of emissions from Samoa to the anthropogenic sources of greenhouse gases that are blamed for the warming of the globe is not known. This called for Samoa to become involved in the global actions to prevent climate change.

In the upper atmosphere the destruction of the Ozone layer is a matter of great concern. Samoa has taken steps towards the reduction of Ozone Depleting Substances (ODS) although its consumption is minute compared to large industrialised and other developing countries. While there is a global drive towards the protection of the Ozone Layer from ODS, Samoa's national actions are very much in a stage of infancy. Samoa started development of its accession to the Vienna Convention and Montreal protocol in 1992.

Samoa in the early 1990s had an ad hoc Disaster Management Committee that became operational in times of extreme events. Their work centred mainly on estimations of damage caused, facilitating early warning systems that was dependent on information fed from as far as Fiji and coordinating relief work. There were no long-term response strategies or adaptation programmes to prepare the public, and to improve the resilience of infrastructure against climatic extreme events.

3.2 . National actions and achievements

- Samoa plays a leading role for the South Pacific region in international negotiations for an agreement to protect the globe from the impacts of climate change. It ratified the Framework Convention on Climate Change (UNFCCC) in 1994. The scientific assessments of the UNFCCC panels of experts indicated that the two main impacts of climate change that would drastically affect small island states such as Samoa are global warming and sea level rise.
- As part of the implementation of the UNFCCC, two major surveys were undertaken, the inventory of sources and sinks of Greenhouse Gases (GHG) in Samoa, and the determining of vulnerabilities of Samoa to climate change and sea level rise with consequent identification of adaptation measures to these impacts.
- Samoa's First National Communications to the UNFCCC was completed and presented in 1999
- The Vulnerability and Adaptation Study was completed and indicated that about 70% of Samoa's population and infrastructure are located in the coastal zone. The mapping of areas vulnerable to natural hazards under a World Bank funded project also indicated that 65% of all stations assessed for sensitivity to coastal hazards were highly vulnerable, 20% medium and 11% being very highly sensitive (BECA/GoS, 2001). Only 4% of the coastline is resilient to coastal hazards, which are normally

climate related. Improving the resilience and preparedness through adaptive regimes through integrated land use planning should be a priority consideration.

- The most recent and obvious step taken by government in respect of adaptation to vulnerabilities to climate change particularly in cases of extreme events is the establishment of a permanent National Disaster Management Council to coordinate early warning programmes, strategic response actions during an extreme event and relief efforts after an event. Unfortunately, and aside from ad hoc relief programmes for an extreme event, the bulk of financial support for activities of this council and its secretariat is dependent on external sources.
- The government has also committed itself to improving the resilience of coastal infrastructures to natural hazards by commissioning a National Coastal Infrastructure Management Strategy. The vulnerabilities of the coastal areas to natural coastal hazards have been mapped and used to develop District Coastal Infrastructure Management Plans in order to integrate landuse planning into adaptive measures to natural hazards some of which are caused by climate change. Extensive consultation is required for these management plans to be acceptable and become operative at the village and at least at the district level
- Samoa acceded to the Vienna Convention and Montreal Protocol for the Control of Ozone Depleting Substances (ODS) in 1993. Activities started with the establishment of a National Ozone Team which objective is to develop a National Country programme for the Phase out of ODS.
- Samoa's commitment to the protection of the ozone is further reflected in its ratification of the four amendments to Montreal protocol in London, Copenhagen, Montreal, and Beijing
- The National Country Programme in 1997 saw the first attempt by Samoa to estimate its national consumption of ODS. This exercise faced a number of difficulties particularly with the unavailability of most of the ODS consumption data. It meant that only part of the full consumption was recorded. An estimate was then calculated which although accepted by the Executive Committee of the Multilateral Fund for the Montreal Protocol as a baseline against which Samoa's future consumption is compared, the National Ozone team still felt that the estimated consumption was only an estimate and not a reflection of the actual situation in the latter part of the 1980s and early 1990s.
- In 1999 Consumption of Refrigerants and cooling agents were once again revisited to develop a specific management programme for the control of refrigerants, which were the main types of, ODS consumed by Samoa. The Refrigeration Management Plan (RMP, 1999) mainly identified the technical issues and obstacles to non-ODS consumption status of the country. The consumption data of ozone depleting substances for the last four years are presented in table 4.

Table 4. Consumption of CFCs in Samoa (metric tonnes)

Substance	ODP	1997	1998	1999	2000
CFC-12	1.0	4.624	2.298	5.821	0.640
CFC-115	0.6	0.258	0.585	0.429	
ODP[1] tonnes		4.779	2.649	6.078	0.640

[1]An ODP tonne is a metric tonne multiplied by the ozone depleting potential of a substance.

- The National Ozone Unit (NOU) has completed the ODS data for the period of July to December 1999 and January to December 2000 The findings revealed that the consumption in 2000 has reduced to 0.640ODP tonnes of CFCs, 0.06ODP tonnes of methyl bromide and 0.059ODP tonnes of HCFC. CFC consumption has continued to drop compared to the previous year. The increased use of ozone friendly substances and low ODP refrigerants shows the country's level of awareness of the danger that can result with continued use of ozone depleting substances.

3.3 Legislative and institutional frameworks

The provisions of the Health Ordinance 1959 that legislate against the creation of nuisance also come into play here. The LSE Act 1989 falls short of legislating against air pollution although it generally provides for protection of natural resources when used or consumed. In this case, air is a natural resource being used as a discharge recipient of emissions. The DEC receives numerous public complaints on Air Pollution and are responded to only through the application of the nuisance provisions of the Health Ordinance 1959. Addressing air pollution concerns is very much constrained by this inadequacy of legislative control, the lack of any air quality standards or at least guidelines against which emissions from known sources can be monitored and controlled against. The Health Ordinance needs an urgent review.

The national lead agency responsible for the oversight and implementation of the National Climate Acton Plan in Samoa is the Department of Lands, Surveys and Environment through its Division of Environment and Conservation, the same implementing agency for the CP and the RMP. It works with the National Ozone Committee to fulfil its activities and obligations under the protocol. A one person National Ozone Unit(NOU) attached to the DEC is in charge of overall coordination of these activities.

In terms of legislation and policies, the NOU has completed the first draft of the "Ozone Layer Protection Regulation" and is awaiting comments from the relevant stakeholders before finalising it and submits it to cabinet for approval.

3.4 Policy development

Policy development in the area of climate change is limited to the national Communications to the UNFCCC and a draft policy is currently under final negotiations

The protection of ambient air quality from pollution remains constrained by the lack of a clear legal basis for its protection. Nevertheless, responses to possible air contaminant emissions are addressed in environmental assessments of new developments, and application of the limited powers of the Nuisance provisions of the Health Ordinance 1959.

The protection of the atmosphere from ODS is an area that has progressed tremendously. In addition to Samoa's ratifications of the Vienna Convention, the Montreal Protocol and its Amendments, two major national plans provide guidance and direction for government actions. These are the National Country Programme for the Phase out of ODS, and the Refrigeration Management Plan (RMP). A national Policy that combines both ambient air and Ozone protection also exists in draft form.

3.5 Capacity building

The RMP activities are still in progress. The NOU has completed the first phase of the training in good service practices and are planning to have the second phase in early 2002. At the same time, the NOU is looking at having the training customs as soon as possible. The delay in this training is due to procrastination with the process of completing the regulation and hence the licensing system. Awareness workshops and annual National Ozone Days commemorations were used to promote awareness of the threats of ozone depletion and the need to reduce the use of ozone depleting substances. Consumption has been reduced for controlled ODS such as chlorofluorocarbons.

The Meteorological service needs strengthening. More resources should be geared towards the operations of the national Disaster Management Council and its secretariat. In the meantime, the national Climate Change office will continue its role within the climate change policy and coordinating externally supported programmes and projects to ensure their objectives; activities and outcomes are consistent with national interests. The implementation of national obligations of Samoa under the UNFCCC is coordinated by a local officer.

3.6 Challenges and issues

- No attempts have been made to determine the quality of ambient air as there is no legislative framework to control emissions. There is also an absence of air standards or guidelines against which emissions are controlled.
- Responding to air pollution complaints is constrained by the lack of equipment to test and justify the existence of contaminants in the air. There is no equipment for monitoring of emissions so the policing role played by both the DLSE and Department of Health are extremely limited
- The implementation of UNFCCC data collection is hampered by model incompatibility and unavailability of baseline data upon which to premise estimates for decisions on best adaptation options. A problem which has been repeatedly encountered in the inventory, which is also common for baseline data in other sectors of the environment, is the lack of quality data and poor data management. This is due to manual recording of emission sources that sometime result in their being lost, while in some cases records of sinks and sources are incomplete

3.7 The Way forward

- In responding to issues on air pollution, government needs to be clear on its interest in protecting this natural resource by seriously considering the development of a national policy for the protection of ambient air quality. There are relevant policy statements with regards to waste emissions in the National Waste Management Policy that can be applied. However complications with standards and levels to be observed limit the waste policy's application to strategic measures. A draft policy already exists which needs to be reviewed so that its provisions are based on actual air quality data in Samoa. One of the first steps to a policy is therefore to collect data on air quality, although the World Health Organisation standards can be applied also. National Guidelines can be developed from this data. The policy should provide the procurement of appropriate equipment for detection, and monitoring of air contaminants in the atmosphere.
- Action Plans defined under the national Country programme, the Refrigeration Management Plan and the currently developed Compliance Action plan for the phase out of ODS will form the basis for actions at the national level, industrial or private sector, and community level. Phase out is targeting 2005 for zero consumption despite having a grace period of 2015 being a least consuming Article 5 party under

the Montreal Protocol. This is to be achieved through public awareness, training of refrigeration servicing industry, training of customs officers to police trade of ODS at the borders, development of legislation and regulatory regimes to control dumping of cheap obsolete white goods into Samoa as well as controlled ODS. Education and public awareness campaigns will continue.

- Easy access to an accurate Greenhouse Gases (GHG) database is vital for a better understanding of the estimated contributions to enhancing GHG pollutants, and their impacts. Future actions in the area of data collection should therefore centre on the need for good quality data from records of GHG sources and sinks.
- All national policies should reflect the need for adaptation to vulnerabilities to climate change. The draft Climate Change Policy that will guide actions in response to climate change into the future will mainstream the importance of climate change issues in environmental planning and development assessment at the national level. The collection, analysis and use or application of data to monitor climate change patterns will be strengthened. Vulnerable areas to climate change have been identified and some useful information already exists to educate the public about the implications of climate change and sea level rise. This information will be used to promote understanding and awareness of predicted impacts of climate change and the greenhouse effect.
- Green House Gas emissions from Samoa and its contribution to global climate is extremely insignificant compared to developed countries. It will make sense therefore so say that while Samoa takes on actions to reduce GHGs in support of global efforts to prevent climate change, more serious consideration should be given to adaptation opportunities, as there is compelling evidence that by global standards Samoa is one of the most vulnerable nations to climate change impacts.
- Education remains a major area for mitigation campaigns in response to climate change and sea level rise. So are the needs for regulations, more demonstration projects and surveys to update the data. Within these areas, there are specific needs to be addressed either locally or jointly with external assistance offered under the UNFCCC and its protocols.

Chapter 4. URBAN AND RURAL ENVIRONMENT

4.1 Context

The management of Samoa's urban and rural environment has been an area of growing concern in its recent history. The push for development progress has prompted the need for integrated landuse systems to be properly planned so as to take into account all aspects of the environment – physical, social – and economic. Coupled with this is the increasing clarity of the idea that urban management needs and demands are different between urban and rural communities. After ten years since the Rio Declaration, the improvement of activities and the processes that characterise an enhanced and sustainable urban and rural environment remain an area of high priority for Samoa.

This chapter will discuss the trends in the urban and rural environment of Samoa in the last 10 years. Focus will be on the changes experienced within the government as well as in the private sector and local communities as they progressed into the 21st century. A major contributing factor that affected the planning and management initiatives of government to address environmental issues is the incorporation of Environmental Impact Assessments in development planning. Any progress achieved to improve the urban and rural environment can be measured through the analysis of programmatic activities initiated, and their impacts on addressing the urban and rural environment issues pertinent in the 1990s.

4.1.1 Urban and District Development (Infrastructure Development)

An integrated system of urban management and planning is an integral part of sustainable development. It takes on a holistic approach to achieving the planning and management of development goals and objectives at the national, regional and local levels. It is hoped that the most recent development of a Planning and Urban management agency initiated under an ADB funded project would finally give rise to the incremental and staged birth of a planning mechanism for Samoa.

4.1.2 Challenges and issues

- It is of great importance to recognise that while many of the issues critical in 1992 remain relevant, focus in the second half of the last decade going into the 21st century had shifted to empowering the private sector and communities in order to enable the management and protection of the environment within which they live and operate.
- There is still no legislation that exists to deal with integrated planning and development processes and resulting environmental outcomes. At the national level, national planning responsibility is led by the Treasury Department through the development of the Statement of the Development of Samoa (SDS) supported by line ministry policies where the DLSE is responsible for policies pertaining to the protection of the environment.
- As part of the reform process, the government in the mid 1990s converted crown owned plantation lands to low-density fringe residential development and infill development of freehold lands within established inner urban villages. These factors together with the demands of a rising population from internal migration encouraged urban expansion. In essence therefore, urban expansion is influenced mainly by land tenure rather than an integrated planning system that Apia lacks (ADB/GoS, 2000).

Although Apia's population constituted the smallest proportion (only 21%) of the total population compared to other major areas of the country, as illustrated in Table 5, it was by far the most congested on the basis of density. Some residents even live on blocks of land that were less than a quarter of an acre, which is much less than the legislated minimum size for a subdivision

Table 5: The regional distribution of population in 1991 and 2001 censuses

	Population Number	**% Population Share**	**Population Number**	**% Population Share**
Region within Samoa	**1991**		**2001**	
Apia Urban Area	34,126	21	38,557	22
North West Upolu	40,409	25	52,412	30
Rest of Upolu	41,713	26	41,345	24
Savaii	45,050	28	41.826	24
Samoa	161,298	100	174,140	100

o The ADB/GoS report (2001) stresses the need for an integrated urban planning mechanism for Apia given an increase in the size of Apia urban area, and its number of residents by 26 %. Table 6 compares the changing population of Apia from 1981 to 1999 with its changing boundaries and service coverage.

Table.6 Population – Urban Apia, 1981 - 1999

Population indicator	**1981 Population and Housing Census**	**1991 Population and Housing Census**	**1999 Agricultural Census**
No. Persons on Growing Apia	45881 (4 districts)	48616 (4 districts)	61,401 (6 districts)
% growth increase in urban population	NA (1971 – 1981)	6% (1981 – 1991)	26% (1991 – 1999)
Population of Samoa	156,349	161,298	164,217
% urban share of national population	28%	30%	37%

(Source: 1991 Census of Population and Housing and 1999 Agricultural Census)

The implications of urban growth in Apia and its adjoining areas will continue to rise without an integrated strategic response, and its growth corridor to North West Upolu will be pressured to accommodate such growth. These patterns of growth will lead to continued pressure on resources of Apia as well as continued economic, social and environmental change within the wider regions of the country. In this context, the unplanned expansion of Apia cannot be ignored as urban environmental problems continue to rise. The range of issues predominant include domestic and industrial waste disposal, overcrowding and privacy issues associated with siting new houses; flooding caused by building on flood prone and poorly drained lands; dead animals

such as cattle and dogs; reclamation of coastal lands and destruction of mangroves; septic tank effluent flowing into the groundwater and coastal ecosystems; and urban catchments impacts on water quality and land resources.

- The Environment Impact Assessment (EIA) process needs to be legalised as a matter of priority. The urban and district environment therefore continues to strive for an integrated planning system or mechanism that is sensitive to environmental values, and promotes sustainability of economic and welfare initiatives that also incorporates the requirements for EIAs. History clearly suggests that the pressures to maintain the status quo on the need for urban management system have proven stronger than those attempting to bring about urban change (ADB/GoS, August 2001).
- The Apia urban area is rapidly growing, dominating the settlement pattern in Samoa with over 350 smaller rural villages supporting it (ADB/GoS, 2001). The prevalent development pattern emerging is one where both rural and urban villages are generally located close to the coast. Villages are growing rapidly in the urban hinterland, stretching to the extent of their village boundaries. As a result, villages now form one linear strip of urban development between Apia and Faleolo. The same pattern is also evident in Salelologa on the south-eastern Savaii but on a much smaller scale. The benefits of being nearest to national infrastructure providing urban services or transportation, electricity, telecommunications, such as better access and services has led to a shift in village set-ups in the urban area. The traditional village setting of homes being built around the central village malae or common land is contrasted to newer urban related 'quality of life' concerns based on infrastructure needs that are now driving different patterns of housing and land use such as those fronting the main road between Apia and Faleolo.

4.1.3 National actions and achievements

The main question in evaluating progress is whether there have been any marked changes in the structures or systems introduced and adopted, their characteristics described by the quantity and quality of specific sectoral outputs, and approaches utilised that brought about the changes. Looking back ten years much has to be said about the changes in the area of environmental management with marked improvements in programmes and project operations.

- Development programmes were not well coordinated, with individual government sectors promoting their own programmes, often in isolation from other efforts and sometimes in conflict with them. This ad hoc approach to planning and urban management resulted in a fragmented development system that wasted Samoa's limited resources (GoS/NEMS, 1994). A number of planning entities existed in various government departments with little coordination. The situation has been rectified with restructuring of the project administration and aid management systems in the late nineties. Progress in integrating environmental concerns into national planning and economic development has been reflected in the National Strategy of government where national policies to address environmental pollution have been prioritised and articulated in the first Statement of Economic Strategy for 1996-1997.
- Recent national infrastructure developments have also opened up to the scrutiny of environmental regulatory instruments. For specific sectors of the urban and rural environment, the changes are evidenced by shifts in institutional and legislative arrangements, policy outputs, capacity building, and most significantly wider awareness of urban and rural environmental issues and problems.

- **Policy Development**

The changes that have come about in the area of policy development, as a response to urban and rural environmental problems, although slow show tremendous progress. In 1992 the Lands and Environment Act 1989 provided both legislative and policy directions for the management of urban and rural environment. The first major national policy initiative was the National Environment Development Strategy (NEMS) in 1994. Government's national Statement of Economic Strategy later approved the same, where policy development within the area of waste management, land use, water, and population were prioritised.

- Recently has a real practical and integrated system for planning and urban management eventuated. Recommendations for planning, delivery and management of urban services is currently under consideration by government. The National Land Use Policy is expected to facilitate the expedient endorsement of this important initiative. Government's endorsement of the National Coastal Infrastructure Management Strategy also stepped up the overall planning land uses in both the urban and rural communities. All these planning instruments also set the basis for future national planning, land use, and urban management and development directions.
- The policies of government relating to mandatory environmental impact assessments of coastal projects add to the implementation of the land use policy. Guidelines for Environmental Impact Assessments have also been established and provide an invaluable reference for developers and DLSE reviewers as well. An interim Code of Environmental Practise (2001 (c)) currently provides guidance for major works of infrastructure service providers. Also providing support for ensuring environmental impacts of developments are addressed, the Treasury department released their Manual on Project Planning and Programming for National Development (1998), which specifies a requirement for environmental assessments.

- **Legislative framework**

  Legal instruments providing the mandate for the protection, management, and development of urban and rural environment remain primarily with the *Land Surveys and Environment Act 1989*. Other relevant legislation include the *Health Ordinance 1959, the Poisons Act 1968, Internal Affairs and Rural development Act 1983, Customs Tariff Act 1975, Public Works Ordinance 1959.*
- The legal provisions for EIA are generally provided in Part (viii) of the Lands and Environment Act 1989. The draft EIA Regulations has been with government for sometime. It should be noted however that despite the absence of legislation for EIAs, its practise is already widespread by way of national policy and guidelines.

- **Institutional Arrangements**

  There is no change in the institutional arrangements for urban and rural environmental management since the establishment of the Division of Environment and Conservation (DEC) in 1990. The Health Department also maintained their Environmental health unit to deal mainly with issues directly related their health programmes. Recently the Health Department established a health Care Waste Management Unit that will be working closely with DEC.

  A major institutional arrangement is in the pipeline for a National Planning and Urban Management Agency.

- **Infrastructural Initiatives**

  Infrastructural developments for the protection of the urban and rural environment have progressed mainly in the area of waste disposal. The Vaitoloa landfill in the mangroves was closed and shifted to Tafaigata. The same is undergoing an upgrading development. A new landfill was also designated on the island of Savaii for disposal of inorganic waste generated.

A number of onsite sewage treatment plants have been constructed with new large buildings in town. Drains have been improved, a new seawall on beach road and footpaths have been established in suburban Apia. In the central business district, footpaths are currently being upgraded.

- **Capacity Building and Awareness**
  The most notable change in capacity building and awareness is the strengthening of the environment agency of government within the DLSE. In 1992, there were ten staff in the DEC, and seven were local technical staff. At present there are twenty-two, all of whom are locals. The implementation of international environmental agreements that Samoa has ratified also enabled the appointment of three desk officers filled by local personnel.

4.1.4 The Way Forward

- Future options for development and management of the urban and rural environment should be based on an integrated national planning and urban management system that is sensitised to the diverse needs of he urban and rural communities and settings. While progress has been made in the various sectors of the urban and rural environment such as waste disposal, climate change, air pollution, and land use, the full achievement of objectives set out in the NEMS and national SES remain to be realised. This is due to national, village and private initiatives being constrained by the lack of legal force behind legislative protection measures, lack of qualified personnel, lack of resources and incompatibilities with the social and cultural contexts, some of which have taken quite sometime to bridge.
- Efforts to establish an integrated urban planning and management system that is responsive to urban growth pressures on the environmental and socio-economic settings are more likely to be successful if they build on the existing capabilities of agencies and village groups already servicing the urban area. It should be understood however that these existing capabilities may change in the future as a result of possible restructuring under the public sector reform programme
- An integrated urban planning and management system for Apia should be premised on the following:.
  - A change in attitude and understanding is needed to understand Apia's growth;
  - Coordination and planning by a professional and fully resourced body or entity.
  - There is increasing need for participation of all affected stakeholders in the planning process, as often development is happening without consideration of impacts on adjoining landowners;
  - There is a need for choice of housing to meet affordability levels of the population;
  - There is a need for balanced development not only within Apia but also on both Upolu and Savaii stressing the point that what is good for Apia is also good for Samoa;
  - There should be equity of access to services;
  - There is need for support systems for village development such as land for plantations, recreational facilities good transport;
  - All costs of urban growth should be considered and;
  - Priority should be placed on transparency and accountability.
- An integrated urban planning and management system is the means by which to manage the environment and the use of resources. It should provide the overarching tool by which to plan sustainable forms of development that will meet

both community and government's desired outcomes and expectations. It should aim to improve the quality of life in Apia urban area. With this vision, major functions of the system can be suggested.

- Defining the outcomes that the planning system needs to achieve in a responsive and accountable way. These outcomes should account for the influences the system has on community needs, which will usually change over time;
- Specifying the key parameters of the planning system such as the urban boundary, transitional arrangements to address incompatibilities with community expectations to ensure changes that could come about are appreciated;
- Provide regulatory policies and frameworks such as EIA processes and adherence to Codes of Environmental Practise and other national Codes;
- Provide policies and plans for the delivery of urban services that are required to sustain the quality of life that is desired.

In order for the planning system to have force, there should be supportive legislative basis and should be made accountable for achievement of its time framed objectives. It should also act as a coordination mechanism, extending its responsibilities beyond the provision of urban services to coordination of land use plans for education, health, transportation and public leisure needs. A strengthened institution or independent agency should be set up to perform these functions on behalf of the government.

CHAPTER 5: MANAGEMENT OF WASTES

5.0 Introduction

Municipal waste in Samoa has several features that make it unique from municipal waste found in larger industrialised nations such USA, Australia and New Zealand. Samoa has increasingly shared in the problems of waste disposal. In the meantime, as the economy of Samoa develops and moves towards a cash-based, consumer goods society, the volumes and complexity of waste products increase.

Much of the modern waste stream generated within the Apia wider urban area may take years to break down, and some components of these wastes may also be harmful or hazardous.

Samoa has many pressing demands on its limited resources of foreign exchange, hence it is crucial to prioritise correctly. Nevertheless Samoa has moved ahead with its national and community programmes to address waste disposal issues through policy, institutional and sectoral project development and implementation.

5.1 Context

5.1.1 Waste disposal

Little was known about patterns and nature of waste generation, management, and disposal prior to 1992 because there was no public collection of solid waste in rural areas, while the collection in Apia covered only part of the whole Apia urban area. It was however assumed from visual observation and demands for waste management services that solid waste in particular was on the rise. The waste was not understood fully as information about their types, quantities and hazardousness did not exist.

Household waste disposal in areas that were not served by the municipal collection occurred in whichever way that was most convenient to each family or establishment such as dumping down the banks into the rivers or streams or along the coast. Some rubbish is buried or used as fill material, burned or composted. On the big island of Savaii, these methods of disposal were inevitable as there was no public disposal site or facility for people to take their rubbish to.

The designation of a new landfill in 1992 saw the closing of the 20-year-old dump in the Vaitoloa mangroves, and shifting to Tafaigata. However the Tafaigata landfill has no lining and is also not constructed to a sanitary engineering design. Hence, the risk of methane emission, and leachate seeping into the groundwater downslope from it remains a real threat.

The main legislation that covers solid waste management in Samoa is the Lands Surveys and Environment Act 1989. Provisions for the control of litter, designation of waste disposal sites, and prohibition of pollution of Samoan waters are provided for in part VIII of Division 8 of the said legislation.

5.1.2 National actions and achievements

Waste disposal

- **Policy development**
  A National Waste Management Policy in now in operation to guide data collection and updating, the development of strategic plans for better waste collection, transportation and disposal of waste, and promoting awareness through education.

  The Population Policy although it appears encompassing by title, only focuses narrowly on how population pressures on the environment should be addressed. Hence it deals not only with accommodating the growing population in urban Apia but also with the needs of a modern population that Samoa's physical environment has to cater for.
- Health care waste is the responsibility of the Health Department. A Health Care Waste Management Strategy is in place albeit in draft form. Its implementation however has already started with the assigning of a new management unit that specifically deals with health wastes.

- **Legislative framework.**
  The provisions for waste management of the 1989 LSE Act remains unchanged. Its enforcement however has been instrumental in ensuring that polluting impacts of uncontrolled disposal of waste was effective. Culprits of illegal disposal have been cooperative after being threatened with legal action and fines. Improved public awareness of these fines has resulted in immediate responses for obedience from

culprits when implicated in illegal dumping incidents. A court case is yet to be called on a purely waste related matter however one case that involved spilled kerosene from a vessel in 2000, resulted in the vessel owners being fined and paying for the clean up.

- Under the framework of the State of the Environment Report and NEMS strategy released in 1993 and 1994 consecutively, the DLSE (being mandated the responsibility for waste management) started work in the area of waste assessment and evaluation of public awareness of waste management issues and problems, to enable its strategic planning and policy development unit to address waste problems.
- Three waste characterisations have taken place. These are summarised in Table.7. The findings pointed to a waste generation rate that was similar to the larger countries of the Pacific such as Fiji, Solomons and Vanuatu, and the same rate has increased over the years from 0.52 kg/person/day in 1994 (Gangaya) to 0.86kg/person/day in 1999 (Malua, 2000). The latter generation rate is applied to the total population of Apia to estimate the total amount of waste generated in Apia and remains relevant today. A similar survey was conducted in Savaii, at Faasaleleaga as an example of rural area waste generation. A lower generation rate of 0.45 kg/person/day (Malua, 1998) was recorded.

Table. 7 Amount and Composition of Solid Waste from 1994 to 1999.

Parameter	Apia		Faasaleleaga
	1994	***1999***	***1998***
Generation Rate (kg/person/day)	0.52	0.99	0.45
Total waste generated in Apia in 1 year	6,643,000 kg or 6,000 tonnes	13,051,962 kg or 13,000 tonnes	Need current population for Faasaleleaga to estimate.
Total volume of waste to be disposed each year	46,454.5 cubic meters	91,272.5 cubic meters	-
Waste Composition	%	%	%
Paper	13	7	2
Plastic	8	8	18
Metals	14	7	40
Biodegradable or organic	59	68	20
Glass	2	2	13
Textiles	3	5	3
Potentially Hazardous Wastes	<1	1	<1
Others	<1	2	3

- Evaluation surveys were conducted to gauge the level of awareness and understanding of waste management issues and solutions in the country. The conclusions pointed to high general awareness of DLSE's waste programme, but detailed understanding of types and environmental impacts of waste is at an average level. It is apparent that more awareness programmes need to be implemented.
- The National Waste Management Policy, which was approved by government in September 2001, is now implemented and taken account of in any development initiatives instigated by both the private and public sectors.
- The government has expanded its municipal solid waste collection service to cover the rest of the two main islands of Upolu and Savaii. A new landfill is also developed on the island of Savaii, which is mainly rural while the landfill at Tafaigata is in the early stages of being upgraded to an engineered sanitary landfill. The landfill at Vaiaata is a response to a long overdue disposal site for the whole island of Savaii. As an initial response to the need for urgent upgrade to the landfill and lack of funding earmarked for its daily operation, government introduced a disposal fee for all incoming wastes to the Tafaigata landfill in January 2001.

5.1.3. Coordination and cooperation

Government actions to address waste management problems take on an integrated approach. This involves first of all attempts to understand the waste stream and management options being used. This information was then used to develop the approved National Waste Management Policy, the proposed Solid Waste Management Strategy for Apia, and the relevant programmes of DLSE such as municipal solid waste collection, development of landfill, introduction of waste disposal charges, and most importantly public awareness and education campaigns for proper disposal of solid wastes.

5.1.4 Capacity building, education and training

Public awareness programmes using various media (mainly radio and TV), and school information kits to go hand in hand with specific waste presentations are targeting grassroots programmes of villages and district communities and Non Governmental environmental organisations working on expanding the public's awareness of waste management issues. One way of disseminating information and technology that deals with waste is through demonstration projects. One of the objectives of the National Policy on Waste Management is to promote environment friendly technologies hence the pursuance of composting trials at village level and waste to energy pilots at the national level.

5.1.5 Challenges and issues

- There is a growing concern with regards to the increase in non-biodegradable wastes, textiles, potentially hazardous and other wastes in the urban area.
- The enforcement of the provisions for waste management controls under the DLSE Act 1989 had been constrained however by the lack of DLSE personnel and the much needed support from the police department officers to impose penalties.

5.2. Sewerage

5.2.1 Context

During each attempt of government at establishing a planning and urban management mechanism for Samoa in the past, a great deal of emphasis was also placed on sewerage as a priority issue to address (ADB/CHD-GoS, 1997). There were proposals and plans for commissioning a conventional sewage system. However none had come into fruition.

A few commercial establishments, the main hospital, and major hotels in town have on site treatment plants that discharge treated effluent into streams and the sea. Operation of these plants is however sometimes inadequate resulting in untreated effluent escaping into the receiving waters. The rest of the homes and other establishments are served by septic tanks, pour flush toilets, pit latrines or latrines on waterways. Groundwater contamination by effluent, and in particular coastal marine waters in the urban area of Vaiusu Bay, had been an issue of real concern.

In the absence of a central reticulated sewage system, there is widespread use of on site sewage disposal methods such as septic tanks and pit latrines (ADB/CHD-GoS, 1998). These tend to work well in higher elevations to wards the central high lands of Apia urban area where porous volcanic soils allow effluent to soak away on rising grounds (ADB/GoS , 2001 (b)). New onsite treatment plants are used in parts of Apia, but are not

as effective due to the low elevation of land on floodplains and mixing with tidal fluctuating levels. The groundwater levels in the lowlands are also high and easily protruded by sewage effluent sometimes opening directly to open drainage channels, streams and rivers.

5.2.2. National actions

- Reviews and integrated studies were carried out in 1996 and 1998, which proposed ocean outfalls at Vaiusu Bay. A cofinanced project is in the pipeline for a sewerage system for the Apia urban area.
- Trials of alternative sewerage treatment schemes such as composting toilets have been done in collaboration with private entrepreneurs and with assistance through a regional project

5.2.2 Challenges and issues

- There is no central reticulated sewerage system. Cost has been a prohibitive factor in many sewage system proposals. A piped sewage reticulation and sewage treatment system is an urgent priority in high population and low lying areas in Apia to protect human health, the marine environment, coral reefs, groundwater and to improve the unsightly and odorous drains.
- Microbial quality and concentration of nutrient Phosphorous in the reef and along the bay from sewerage are of much higher levels than recommended baseline.

5.3 Other wastes

5.3.1 Context

There is a lack of information available on commercial, industrial, hospital and chemical wastes, and the inadequacies associated with management and treatment methods used to deal with them.

While solid waste from small shops and office premises were being collected together with municipal waste from households, commercial waste from main department offices were not. Some of this commercial or paper waste sometimes end up in piles behind the office blocks or abandoned at boundary of office premises.

Quantities of industrial wastes disposed by manufacturing establishments were not estimated. However the increase in industrial activities and proliferation into diverse types, particularly the Vaitele industrial zone, meant that industrial waste was also increasing and becoming diverse. Most of this resulting waste was in the form of discarded packaging, and nutrient loaded discharges in liquid effluent or production line solid refuse. The liquid effluent, in addition to domestic drainage and sewage, has been attributed as a principal cause of degradation of the adjacent lagoons and reefs particularly in the Vaiusu Bay (Convard, 1993).

Health care waste constituted a significant problem in terms of public health as a result of inadequate collection and disposal of discarded sharps and contaminated surgery theatre dressings and bandages at the national and district hospitals. There was inadequate separation and no system was in place to properly collect different types of waste from the wards. A broken down incinerator burned body parts and other pathological wastes at the National Hospital, but its burning efficiency was way below the World Health Organisation (WHO) levels of destruction. As a result of these inadequacies there was frequent casual disposal of health care wastes concerned about

the grounds and into the drains (WHO, 1996). A project to build an incinerator is in pipeline with funding to be provided by JICA.

There is concern about the use and disposal of various chemicals, agricultural pesticides and herbicides, empty containers, and household chemicals especially those which use was discouraged worldwide because of proven health implications on humans and were deemed obsolete such as DDT, Dieldrin, Chlordane and PCBs. Waste generated by the manufacturing industries in Samoa is taken to the Tafaigata landfill for disposal. These constitute mainly cardboards and empty containers, food processing residues, off cuts and wrappings, old households appliances from the servicing workshops, broken glass etc. The actual amount or quantities of waste generated from manufacturing establishments has not been determined although according to records from the DLSE office at the Tafaigata landfill, more than 50 % of vehicles delivering waste for disposal are from the industries, usually in truckloads.

A number of manufacturing companies are involved in recycling glass bottles, aluminium cans and other metals. For instance the Vailima Breweries reimburses empty glass bottles at 40sene for a big bottle and 20sene for a small one, with 95% of bottles being returned. One of the largest manufacturing industries in Samoa, Yasaki has a recycling sewage system where treated wastewater is recycled to flush toilets and urinals. The Vailima Beweries also has an on site sewage treatment plant.

5.3.2. National actions and achievements

- The DLSE as the environment agency of government has started national initiatives to combat the propagation of hazardous waste chemicals as well as potentially hazardous substances in Samoa. Leading on from its commitment to international agreements controlling the transboundary movement, and disposal of hazardous wastes in sites that cannot accommodate the destruction of these substances, Samoa is already in the early stages of putting together a National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants
- The international Basel Convention on the Transboundary movement of hazardous wastes and its regional version in the Waigani convention have been ratified with a national policy planned to translate these control measures to the national level. It is hoped that international and regional programmes for phasing out the use of POPs and their wastes, will be nationalised to enable the establishment of control measures that will address the threats of land, air and water contamination by these potentially hazardous wastes and substances.
- New landfill sites have been developed. Infrastructural developments for the protection of the urban and rural environment have progressed mainly in the area of waste disposal. The Vaitoloa landfill in the mangroves was closed and shifted to Tafaigata. The same is undergoing an upgrading development. A new landfill was also designated on the island of Savaii for disposal of inorganic waste generated.
- A number of onsite sewage treatment plants have been constructed with new large buildings in town. Drains have been improved, a new seawall on beach road and footpaths have been established in suburban Apia. In the central business district, footpaths are currently being upgraded.
- A number of demonstration projects in waste separation have been carried out and have greatly enhanced public awareness of waste management.
- A regional project by SPREP (May 2000) undertook a visual estimation of agricultural chemicals, pesticides and other hazardous wastes present in Samoa. The number of sites contaminated by these hazardous substances was also investigated. Although more specific details need to be obtained in order to define the exact characteristics of these chemical wastes, they seem to be most significantly present in agricultural

pesticides, PCB contaminated transformer oils, timber treatment chemicals, and waste oil.

The estimates are summarised in Table 8 below.

Table 8. Hazardous Chemicals and Wastes

	Estimated Quantity
Agricultural chemicals	200 kg
Buried agricultural chemicals	3,000 kg
Oil potentially contaminated with PCBs	9,000 L
Abandoned timber treatment chemicals	10,000 L
Laboratory chemicals	400 kg
Contaminated sites	8 sites

5.3.3 Institutional/legislative framework

The current regulatory framework for health care waste management is sourced from four main statutes some of which date back to as early as 1950s. The Health Ordinance 1959 provides for abatement of nuisances that could be dangerous to health or regarded as offensive. Hence while the Health Ordinance provides the Department of Health with a mandate for abatement of health care wastes that have accumulated to a state where it becomes dangerous to health or offensive, it does not provide for its collection and disposal. The Poisons Act 1968 is another relevant legislation but focuses mainly on control of sale, storage and handling of poisons, which may exclude hazardous wastes. Part VIII of the LSE Act 1989 has the mechanisms available to enable appropriate standard setting and controls to be put in place to manage the collection, treatment, transportation and disposal of health care waste.

Recently the Health Department established a health Care Waste Management Unit that works closely with DEC.

5.3.4 Challenges and issues

- The current management practises for health care waste indicate a number of critical issues. These emanate from all stages of the waste lifecycle generated by health care establishments. Infectious waste is not segregated at source from the total waste stream and no colour coding is used to distinguish infectious from general wastes (World Bank, 1999). Pathological waste is separated from the rest of the waste stream then incinerated and the residual ash is dumped around the incinerator shelter. Incinerator facilities need upgrading. At the Tuasivi hospital in Savaii, all wastes from the wards and clinics are burned in the hospital incinerator.
- The only segregation of wastes took place recently with pathological waste from sharps. Sharps are placed in yellow coloured plastic boxes then transferred to be buried in cardboard boxes at Tafaigata landfill. The yellow sharp boxes are reused. Pharmaceutical wastes of obsolete medicine are stored at the laboratory then transported to Tafaigata for burial. Other waste residues from the Laboratory tests are autoclaved then flushed into the wastewater drains and into the hospital sewage treatment plant. Estimates have been determined for health care waste.

These are summarised in Table 9

. Table 9: Estimates of health care Waste Generated in Samoa

Facility	Beds	Hazardous Wastes (kg/Day)	Sharps (Container /Day)	Domestic Waste (kg/Day)
TTM Hospital				
Wards/Outpatient	**201**	**120 -150**	3 - 5	800 – 900
Laboratory	-	15 -20	0.1	20 – 30

Operating Theatre	-	10 -15	0.1	20 – 30
Pharmacy	-	0.5	-	6 – 10
Dentist	-	1.0 -2.0	0.25	10 – 20
Upolu Rural Centres	**197**			
District Hospitals	66	5.0	0.2	40
Health Centres	131	4 -6	0.2	25 – 30
Sub Centres	-	3 -6	0.2	25 – 30
Savaii				
MTII Hospital	20	10 -15		
Dentist Lab	-	-	0.25	100
Sataua Hospital	10	1 -15	0.25	6 – 10
Health centres	58	3 -4	0.15	20 – 25
Sub Centres	-	3 -4	0.2	20 – 25

(Source: Department of Health, 2001)

5.3.5. Capacity building

The level of awareness has also been determined for ozone issues and waste management. The outcomes indicate that there is improved awareness of waste management issues particularly the role of DEC. Awareness of Ozone issues is above average. There is also much interest shown from the private sector in investing in alternative technology that addresses waste management problems, or contribute to reduction of greenhouse gases. Demonstration projects starting from basic composting trials are becoming common to composting toilets.

5.3.6 The Way Forward

- Now that Cabinet has approved the National Waste Management Policy, the next step is implementation. All stakeholders involved in waste management need to be aware that the national policy provides a framework for all other waste related strategies and plans to operate. Integrated national policies and management plans are needed for other types of wastes such as health care waste, industrial and hazardous wastes.
- Alternative integrated waste management systems that emphasise source segregation, collection, composting, reuse, recycling and resource recovery as well as collection, transfer, treatment and disposal should be developed. The strengths of an integrated waste management system lie in sustainability and an emphasis on prevention rather than cure. This is demonstrated through a hierarchy of stages of activities in descending order of priority.
  1. **Prevention** where wastes or emissions are prevented from being generated from their sources.
  2. **Reduction** where methods are employed to reduce quantity or hazardous nature of wastes and emissions at source.
  3. **Reuse** involves the re-introduction of waste and emissions to the same production process or reused for the same purpose without reprocessing.
  4. **Recycling** whereby wastes and emissions are re-introduced to the same process or made available for use in another process.
  5. **Treatment** of wastes and emissions are altered in some ways to reduce their quantity, concentration or hazardous properties.
  6. **Disposal** whereby wastes and emissions are eventually returned to the earth or the atmosphere. Emphasis is placed on ensuring the wastes and emissions are treated.

- At the national level there is a need for continued data collection and improved quality of data and information used for developing strategic and action plans, projects for waste management

At the programme and project levels, the government has set its development directions in waste management towards more demonstration projects, improved service delivery, a review of disposal charges, and updated technology for waste treatment and disposal. Education and awareness programmes have proven effective in disseminating understanding about wastes hence; must be strengthened.

CHAPTER 6 LAND RESOURCES

6.1 Context

Land is central to the economic and cultural structure of Samoa with land of productive potential in ample supply (Statistics Dept/MAFFM, Agricultural Census 1999). However in areas of heavy population concentration, shortages of land under customary land tenure are becoming evident pressure to develop land of marginal value for village sector production. Within central Apia, settlement has been replaced with commercial and other non-residential uses such as the produce market by the conversion of government leasehold lands to freehold. Other land has come from reclamation and informal land filling.

The proper utilisation of land resources according to their appropriate capabilities, as well as vulnerabilities holds the key to sustainable land use management. There have been numerous changes in the way land is used in Samoa in the last decade particularly in Apia for an urban area, and land under agricultural development in rural areas.

Land tenure

Land in Samoa is divided into three main tenure; customary, freehold and government lands as shown in Table 10.

Table 10: Estimates of Land Ownership in Samoa in 1991.

Type	Upolu		Savaii		Total	
	(ha)	(%)	(ha)	(%)	(ha)	(%)
Customary	76,166	17	153,490	54	229,656	81
Government	19,758	7	10,626	4	30,384	11

WESTEC/SLC	9,499	3	4,476	2	13,975	5
Freehold	7,800	3	1,037	*	8,837	3
TOTAL	113,223	40	169,629	60	282,852	100

Source: National Report of the Government of Samoa's Forestry Division, Department of Agriculture, Forests, Fisheries & Meteorology to the FAO/SPRIG/AUSAID/SPREP & SPC/PIFTSP Pacific Sub-Regional Workshop on Forest and Tree Genetic Resources, April 1999, Apia, Samoa

In the rural communities, land remains primarily under customary ownership and a large proportion of it is under cultivation.

A study conducted in 1990 (ANZDEC) produced land use capability maps of the whole country. The maps categorised Samoa's land into four main classes:

1) land with few limitations to agricultural use (39,600 ha);
2) land with moderate limitations to agricultural use and few limitations to forestry (121,700 ha);
3) land with severe limitations to agricultural use and moderate to severe limitations to forestry (59,400 ha); and
4) land unsuitable for agriculture or forestry (69,000 ha)

Table11: Estimates of Land Uses in Samoa in 1993.

Land Use Type	**Area (ha)**	**(%)**
Merchantable Forest	13,574	4.6
Forest Protected/Village Conservation Areas	3,089	1.1
Watershed Areas	31,992	11.3
National Parks/Reserves	2,880	1.0
Land Available for Reforestation	10,000	3.6
Agriculture / Cropland	98,000	34.7
Recent Lava Fields	11,433	4.1
Unproductive Forest Areas	111,112	39.4
TOTALS	282,000	100

Source: National Report of the Government of Samoa's Forestry Division, Department of Agriculture, Forests, Fisheries & Meteorology to the FAO/SPRIG/AUSAID/SPREP & SPC/PIFTSP Pacific Sub-Regional Workshop on Forest and Tree Genetic Resources, April 1999, Apia, Samoa.

The three primary types of land tenure in Samoa, are also present in the urban town of Apia. Public land or land vested in Samoa constitutes 16% and is free from customary title and from any estate in fee simple (freehold). It also includes all land lying below the line of the high water mark which is line reserved for public purposes. Public land also includes land vested in the Samoa Trust Estates Corporation (STEC) and more recently the Samoa land Corporation (SLC).

Freehold land is held from Samoa for an estate in fee simple, and constitutes only 4% of all land. About 80 % of all land is under customary ownership. This is land held from Samoa in accordance with Samoan custom and usage and with the law relating to Samoan custom and usage.

Leased land could be considered the fourth type of land tenure. Land that can be leased includes Government land, freehold and customary land, which must be registered upon application under the Land Registration Act 1992/93. When land is registered it means that it has a unique legal description, its boundaries have been determined or defined, and that the owner(s) are known. One of the prerequisites for land development is that title to the land is secured as this enables long-term use of the land and provides the possibility for security (ADB/GoS, 2001 (b)).

Landuse patterns

The predominant land use apart from indigenous forests is agriculture. A common land use pattern in the villages consists of a residential area with a village common ground or *malae* on a kilometre wide strip of land along the coastline. Next inland is a mixed cropping zone of fruit trees, bananas and coconuts, and further inland is a zone of primary food crops of taro, taamu and yams.

According to the 1999 Census of Agriculture), 90% of land holdings under agricultural use are on customary land with the rest divided between freehold, leased government and freehold land and others. About 87% of land is under crops, 4.7% under livestock, which has increased in the last ten years, 4.3% under bush and fallow while land under non agricultural use has diminished to just 3.4% from 17 % in 1989. This reflects a strong demand for agricultural land and conversion of land previously under non-agricultural use to agricultural use. A notable feature of the agricultural holdings is the higher number of farmers using organic fertilizers (14.8%) than those using inorganic fertilizers (13.7%), while the number of all holdings using agricultural chemicals has slightly risen by 2% since 1989. This is probably due to wide application of chemicals to combat the taro leaf blight.
Of the land under cultivation, the most notable change since the Census of 1989 is land under taro which has decreased dramatically to just 10% from 29% which is even less than holdings under the giant taro or *taamu*. While this is due to the devastation of the taro blight in the early 1900s it is certain that this crop is slowly coming back.

The present land use pattern has developed from a blending of two farming systems where subsistence village cropping has had a plantation cropping system imposed upon it since European contact.

Minerals

There were neither known oil deposits nor any mineral production. An Australian exploration programme found no useful mineral deposits except titanium, which despite its high concentrations (3 per cent) was not economically extractable. Future development is unlikely, given the high costs envisaged for such an operation.

Construction materials

For government works, fill materials for roads and the Public Works Department (PWD) rock quarry at Alafua near Apia produced concrete aggregate. This quarry contained large quantities of hard basalt rocks. Private operators also produced aggregate crushed from loose rocks for concrete- product manufacturing.

The Vaiusu bay, where dredging operations have taken place over the last twenty to thirty years, is now part of the area along the coast of Apia declared as a national park. Hence, the dredging operations will be relocated from Vaiusu bay once a suitable alternative site is approved.

Beach and lagoon materials were widely utilised by local communities all around the coastline for a number of different purposes, and, construction near Apia created much demand for these materials. It was recognised then, that collectively, sand mining from most beaches of Samoa exceeded the rate of natural supply causing chronic erosion problems in coastal areas closest to the largest demand.

Sand mining remains an important issue. Local construction companies have indiscriminately mined various parts of the coastline often with little or no control from regulatory bodies. This has led to severe erosion problems in some parts of the country's coastline.

6.2 National actions and achievements

- A National Land Use Policy was adopted by government in late 2001. Of most relevance to this report are the objectives to establish appropriate landuse practises that will increase output at sustainable levels, and establishment of integrated planning, assessments and development procedures that will achieve sustainable land use practises.
- The government also turned into national policy a requirement for all its developments in the coastal area, irrespective of size, to undergo an Environmental Impact Assessment, while private developments on the other hand are encouraged to follow suit. The requirement for private developments to conduct EIAs are however included within the policy once consumption of natural resources under the jurisdiction of government is involved as in the reclamation of land from the sea and river banks and extraction of sand and aggregates.
- The use of land and private infrastructural assets in the rural communities fall within the realm of the village councils. Government on the other hand encourages the integrated planning of land use within the coastal areas, especially land that is vulnerable to natural hazards. A programme for all districts of Samoa where management plans are developed to guide the utilisation of land within the coastal area is currently underway-educating people about the capabilities of their lands and how best they could utilise them in a sustainable manner.
- The responsibility for permit issuing and monitoring of sand extractions has recently shifted from Public Works to the Department of Lands Surveys and Environment (DLSE}. A more co-ordinated approach to managing coastal sand resources now exists.
- Coastal-based communities are increasingly more aware of the effects of unsustainable sand mining, not only at the national level, but also to their own lives and are addressing this issue also through traditional governance (e.g – bans/taboos). Issues arising from unsustainable sand mining have increasingly been recognised in various programmes (Climate Change, Marine Biodiversity conservation, and Coastal Infrastructure asset management). The increasing application of Environment Impact Assessment procedures to proposed sand extractions has meant that such extractions could be carried out in a more sustainable manner

6.3 The Way forward - Land Use Patterns

- The proper utilisation of land resources according to their appropriate capabilities and vulnerabilities holds the key to future land use management. The land use capability maps (ANZDEC, 1990) will remain useful for future development. It should however be combined with the coastal hazard maps to determine suitable areas for various land uses as well as those that may need to be avoided.
- With the National Land Use Policy approved by Cabinet, now is the chance to promote land capability guidelines and an integrated land information system that developers can use to guide the best development methods to the most suitable land. Agricultural research, extension services through all community development programmes and projects, as well as related infrastructure should be strengthened to encourage appropriate uses of land.
- The ANZDEC (1990) maps need to be updated however so that they can be assimilated into the land information system currently being developed by the DLSE.
- There is a need for consolidated coordination of development programmes by the various government agencies where the demand for land for agricultural purposes is on the rise, and there is threat of land being cleared in the higher altitudes areas. In responding to this demand the national farming areas access roads programme by the ministry of Internal Affairs is ensuring an unrestrained access to arable land resulting in more and more land being cultivated. The recent expansion in cattle farming with increased use of agricultural chemicals in water catchments areas upstream also present a danger to water supply through contamination.
- A thorough assessment of potential sites for dredging operations should be carried out before a decision is made.
- An ongoing nation-wide awareness programme is required for communities and contractors. Such a campaign should focus on verifying the legal status of sand resources, it should outline the main impacts to coastal communities, and answer any frequently asked questions that stakeholders might have. The programme may outline how villages can help to curb illegal sand extraction

CHAPTER 7. MARINE RESOURCES

7.1. Context

Traditionally Samoans rely on marine resources for their well-being and daily required sustenance. Over 70% of the villages are located on the coastal fringe of the islands, and subsistence fishing is a major activity of the inhabitants of these villages. Seafood consumption in rural families has been estimated at 330 g/person/day (Dept Stat, 1978), 36 kg/person/yr (Zann *et al*. 1983), and 76.3 kg/capita/yr for Savaii Island (Mulipola 1997). Zann (1995) estimated the fish consumption per capita in Upolu Island to be

approximately 21.5 kg/yr, i.e. a subsistence total catch of 2,260 mt for the year (1991). The subsistence catch for Savaii Island has likewise been estimated at around 1,400 mt/year for the same period (Mulipola, 1997, Zann, 1997).

Fisheries also play an extremely important role in the economy of Samoa as well as contributing significantly to the health and nutrition of the people. Fisheries is the major income earner for the country, with reported tuna exports having increased substantially from over 800 metric tons in 1994 to over 5000 in 2001 and was valued at ST$46 million(Watt & Mulipola 2001). Offshore fisheries, in particularly the tuna resource, have been recently developed and now are the most valuable of fishery contributing significantly to Samoa's economy. Bottomfish resources, though highly important commercially, are not sustainable resources due to the restricted nature of their nearshore habitats.

Offshore fisheries, in particularly the tuna resource, have been recently developed and now are the most valuable of fishery contributing significantly to Samoa's economy. Bottomfish resources, though highly important commercially, due to the restricted nature of their nearshore habitats they are not sustainable resources.

With the increase in the population of Samoa over the past two decades, pressures on inshore resources, particularly the more accessible lagoon resources commonly harvested by village fishers, are increasing and more people are looking to the nearshore resources for their subsistence. Moreover, pressures arising as a result of over fishing, inshore environment degradation, ongoing coastal developments, pollution, and natural disasters have adversely affected the coastal resources and marine environment. In general, the state of the marine environment of Samoa is considered to be the most damaged in the Pacific (Zann 1991).

The decline in marine resources is attributed to overexploitation and the use of destructive and overly efficient fishing practices and environmental degradation (King *et al.* 1995). Population increase has also played a major part in the deterioration of both the marine environment and resources. Zann (1999) noted that the status of the marine environment in particularly coral reefs ranged from highly degraded to very good. Many coastal fisheries have been severely depleted and are believed to be fished beyond their maximum sustainable level (Zann 1991, Horseman & Mulipola 1995). Over the past decades, it has been apparent that numerous edible inshore fisheries resources have been heavily reduced due to overfishing, increasing population, natural disasters, increased runoffs and destructive fishing methods.

In recognising the problem of resource depletion and environment degradation, several management regimes have been established to encourage stakeholder participation in the management processes thus promoting sustainable resource utilisation and environment protection.

In this report, the status of the marine resources and environment is discussed as well as the changes that have occurred over the past decade together with management regimes that have been instituted to promote resources rehabilitation and environment management. Finally, the last section provides recommendations for the way forward to further facilitate the achievement of sustainable management of Samoa's marine fisheries and habitats.

7.1.1 Marine fauna and flora

Various attempts and initiatives have been made to improve the knowledge on marine biodiversity in Samoa. The initiatives have ranged from technical research to assess the status and potential of fisheries and habitats to monitoring activities to regularly determine the level of exploitation and impacts of social, economic and environment activities on Samoa's coastal resources. As outcomes of the research and monitoring activities have been available, several conservation initiatives have been initiated to rehabilitate resources and remedy habitat degradation with the aim of ensuring sustainable utilisation and management of Samoa's marine resources.

7.1.1.1 Fauna

Fishes

Listings of Samoan fish fauna documented by previous authors are now included in FISH BASE™, a software programme developed by the International Centre for Living Aquatic Resource Management (ICLARM). Furthermore, Bell & Mulipola (1995) have documented the status of important marine and fresh-water fishery resources (fishes and invertebrates) of Samoa. A status report of reef fishes undertaken by Samoilys & Carlos (1991) highlighted a reduction in biomass and size of fish in shallower and more heavily fished areas, while high biomass was found in less fished and deeper reef slopes. Horsman and Mulipola (1995) have documented the dramatic decline of inshore fisheries as noted by the reduction of artisanal and commercial annual landings. Zann and Mulipola (1995) suggested that the declines in fisheries landings were attributable largely to environmental degradation and habitat loss, overfishing of stocks, using destructive fishing methods and reduction in fishing effort.

Green (1996) after surveying seven sites on Upolu island, observed an increase of fish species richness with depth and with deeper habitats having more species than shallower sites. Horsman and Mulipola (1995) have remarked that market landings improved from 1992-1995 and suggested that this was due to potential regeneration recovery of marine resources following the devastation sustained by cyclones in 1990 and 1991.

A fisher creel census conducted on Savaii in 1996-97 indicated that reef fish, such as surgeonfish (*acanthurids*), parrotfish (*scarids*), emperors and snappers (*lethrinids* and *lutjanids*) were the dominant species in catches. The grey mullet (*mugils*) composed a significant proportion of the landings, but were captured in large quantities in only a few areas such as the southeast and the northwest regions. Predatory fishes such as carangids (*malauli*) and serranids (*gatala*) were a relatively minor component of the total landings.

From the same study, Mulipola (1997) found that the majority of surgeonfishes (*Acanthuridae lineatus, Ctenochaetus striatus* and *Naso* spp) fell within the 16-20cm length interval. Convict surgeonfish catches (*A. triostegus*) predominantly fell within the10-15cm length interval. Most (61 per cent) parrotfish caught were between 16cm to 30cm in length. Likewise, most wrasses captured were between the 16 and 30cm sizes. Emperors caught (70 per cent) fell within the 16-20 cm size range with the majority of snappers ranging between 16cm and 30cm. Mullets (*Mugil)* appeared to be caught in two different sizes; 10-20cm and the large size of 40cm plus. Trevallies (*Carangidaes*) caught were mostly between 16cm and 30cm in length. The majority

of reef and lagoon predatory species caught were between 16-20 cm. Much of the harvested catch of the study is below minimum legal sizes as allowed under the Fisheries Regulations of 1995.

The Fisheries Division implements an ongoing monitoring programme to determine the status of fisheries from landing catches annually. From the 2000/2001 domestic market landings (Table 2a & b), the dominant inshore originated fish species by weight quantity were the unicornfish (*ume*) 30%, mullets (*anae*) 16%, parrotfish (*fuga*) 13% and surgeofish (*alogo, pone*). Finfishes contributed about 60% of the domestic fishery landings in 2000/01 period with offshore and inshore originated fishes accounting for about 70% and 30% respectively (Fisheries Division Annual Report 2000/01). The two marine crustacean that are commonly sold domestically were the spiny lobster (*Panulirus pencillatus*) and mudcrab (*Scylla serrata*) which comprised 60% and 31% Fisheries Division Annual Report 2000/01). Of the total fisheries exports in the year 2000, more than 80% were tuna fish species of which albacore (*Thunnus alalunga*) accounted for about 90%.

An attempt to understand fish diversity has been recently undertaken by the Fisheries Division. About 800 specimens of fishes originating from offshore and inshore that were landed at the Apia fish market have been gathered and studied to determine their length and weight relationships.

Corals

The state of the coral communities of Samoa was said to be severely impacted by anthropogenic factors and the 1990/91 cyclones (Zann 1991). A recent survey conducted by Green (1996) reported that despite the cyclones and other impacts on the coral reefs, the reef fronts were in reasonably good condition (Table 4). Most of the sites surveyed supported healthy coral assemblages, with dense stands of plate corals present, which were not observed in any of the other islands in the archipelago. Furthermore, the reefs at Fagaloa and Vaitele were in exceptionally good condition with lush coral communities and diverse fish communities (Green 1996).

Initial assessments of many community-owned marine protected areas indicated tremendous coral recovery and growths. The baseline assessment of Tauoo-Moamoa community-based marine protected area located on central northern Upolu showed significant coral recovery with rubbles being cemented together to provide substrates for rejuvenating coral growths (Mulipola, 1997).

Samoa has implemented several initiatives to monitor the status of coral reefs through the Fisheries Division mandated habitat assessment, Marine biodiversity assessment conducted by the IUCN-Marine Protected Areas Project and with Global Coral Reef Monitoring Network (GCRMN) partnership.

Turtles

In addition to the two known marine turtle species, there were reports of several leatherback turtle interacted with the domestic longline fishery. To further understand the movements of turtles in Samoa in order to facilitate developing appropriate conservation mechanism, a tagging programme was initiated by South Pacific Regional Environment Programme (SPREP) in 1995. A tagged turtle from Samoa is reported to be breeding in the French Polynesia area (Toloa 2000), and turtles

tagged in Tahiti have been caught in Samoa. In 2000, a tagged turtle from Samoa was found in Papua New Guinea.

Management strategies promoting turtle conservation have been instituted nationally through regulations prohibiting turtle harvesting for commercial purpose. However, traditional use of turtle is allowed for turtle with carapace length above 72 cm.

7.1.1.2. Flora

Mangroves are uncommon in Samoa, but the Vaiusu mangal near Apia, Upolu Island is considered to be the largest in eastern Polynesia. The Sa`anapu mangal is considered to be an important fish nursery habitat in Samoa (Chase & Veitayaki 1992).

Samoa is not well endowed with seagrass beds with only two species of seagrass recorded (Hartog 1970; McMillan & Bridges 1982 cited in Skelton et al 2000). These marine ecosystems are poorly understood (Taule`alo 1993) but are increasingly degraded by anthropogenic activities (Horsman & Mulipola 1995; King & Fa`asili 1998).

Algae

Several studies on seagrasses of Samoa have been recently conducted. The recent compilation of algae from Samoa and American Samoa by Skelton & South (1999) listed 198 taxa, comprising 15 Cyanophyceae, 89 Rhodophyceae, 33 Phaeophyceae and 61 Chlorophyceae.

Seagrasses

A recent collection was made of a species of *Halophila* from the Palolo Deep Marine Reserve at 25 m depth, which morphologically resembled *H. minor* (Skelton 2000).

Seagrass beds are limited in Samoa, with perhaps the best community found around Manono Island and in the northern part of Upolu Island where the substratum is generally of soft muddy sand. Although Zann & Mulipola (1995) reported an increase in seagrass and algal community as a result of high nutrients, prolonged exposure to such environment can result in the eventual death of seagrass and algae (Coles & Long 1999). More research is needed to document the distribution and the productivity of seagrass beds in coral reef ecosystems of Samoa.

Mangroves

Mangroves continued to suffer from coastal developments despite the institution of conservation and mitigation strategies. Although the protection of mangrove ecosystems is controlled under the Lands and Environment Act 1989, at present, there is no national management plan governing the protection of mangroves (Schuster 1993). Several coastal communities have identified protecting mangroves as one of the habitat management undertakings under the Village-based Management Plan. Presently about 27% of communities with community-based management plan have opted to imposed proper actions to manage activities adversely impacting on mangrove.

7.2 Coastal resources

Coastal resources, in particularly fisheries continue to contribute substantially to the economy of Samoa and the wellbeing of her people. A large proportion of coastal villages has relied enormously on coastal resources for their subsistence needs and tuna fishery is very important to the economy of Samoa.

7.2.1 Inshore fisheries

Subsistence and artisanal fisheries

The inshore fishery resources of Samoa were considered to be in an extremely serious situation especially in a country where the majority of the rural population relies on fish for its subsistence (Zann 1991). Over 70% of the villages are located on the coastal fringe of the islands, and village level fishing is a major activity of the inhabitants of these villages. An Agricultural census carried out in 1989 showed that about 67% of agriculturally active households in Samoa are engaged in fishing and reef gleaning activities and used all their catches for consumption. A more recent subsistence survey estimated that about 77% of rural fishing villages on Upolu were classified as fishing villages and fished regularly each week at subsistence level (Zann 1991). A subsistence fishery survey of the Savaii Island indicated that more than 80% of the families considered themselves to be subsistence fishers (Mulipola 1997).

Subsistence fishing is done on an artisanal basis at nearshore, on the reefs and lagoons where fishes and invertebrates are harvested predominantly for consumption. The total subsistence seafood catches and catch rates over the past two decades is summarised in Table 4. A recent household survey 2000 estimated the total subsistence seafood catch to be 7169 tons, with a value of ST45 million (Passfield & Mulipola 2000). The average catch rate of 2.3 kg/person/hr in 2000 has increased by about 35% over the past decade. Villages with management plans have catch rates averaged at 2.8 kg/person/hr compared to the average catch rate of 1.8 kg/person/hr for villages with no management plans.

The general decline of the inshore fisheries has been a major concern especially with a country where many coastal communities depend on the inshore resources for sustenance. With this concern, in 1995, the Fisheries Division together with the support of the Australian government established a co-management initiative to promote the management and conservation of the inshore fisheries. Recognising the difficulties involved in trying to manage remote fisheries from a central location, Samoa has adopted a community-based approach to subsistence fishery management. A prime consideration has been community ownership of this management. The goal is for each village to effectively manage their own fisheries resources. The strategy to achieve this goal is for the Fisheries Division to encourage and assist each coastal village to develop its own Village Fisheries Management Plan. The strategy process is to encourage a village community to analyse its fishing practices and problems, and suggest solutions. Community undertakings and actions to solve these problems may include introducing fisheries regulations and pursuing other conservation measures. These undertakings and actions are listed in the community-owned Village Fisheries Management Plan. Thirty percent (Table 6) of Samoa's approximately 230 coastal villages now have village fishery management plans whereby practical and appropriate strategies are

identified and implemented to achieve sustainable exploitation and management of the inshore fisheries.

Aquarium fisheries

The commercial exploitation of aquarium fish from Samoa began in 1986 but stopped after 1-2 years. The development was started again at the end of 1992 and the total export of aquarium fish amounted to 65,527 fishes in 1992/93 period. *Pomacentrus* and *Chrysipttera* sp., *Labroides* spp., *Amphiprion* spp., and *Paracirrhitus* spp were the main targeted species. This was followed by a total of 30,405 fish specimens consisting mainly of assorted damsels, wrasses and angelfish exported in 1993/94 period. During the 1996/97 period, two licenses were issued for the export of aquarium fish. One of these operators was also licensed to export a limited amount of corals. Table 7 summarises aquarium organisms exported for the 1996/97 period.

One exporter was in operation in the 1997/98 period, exporting "bio-rock". The exporter was licensed to export 200 pieces of bio-rock per week. A total of about 3,890 pieces were exported during the year. The 1998/99 period saw two exporters in operation with licences granted to harvest and export a maximum of 200 pieces of bio-rock each per week. A total of 7,526 pieces were exported. At the beginning of the year 2000 two exporters have been granted licences to export aquarium products. One operator is permitted to export only bio-rocks

7.3. National actions and achievements

- Various attempts and initiatives have been made to improve the knowledge on marine biodiversity in Samoa. The initiatives have ranged from technical research to assess the status and potential of fisheries and habitats to monitoring activities to regularly determine the level of exploitation and impacts of social, economic and environment activities on Samoa's coastal resources. As outcomes of the research and monitoring activities have become available, several conservation initiatives have been initiated to rehabilitate resources and remedy habitat degradation with the aim of ensuring sustainable utilisation and management of Samoa's marine resources
- Listings of Samoan fish fauna documented by previous authors are now included in FISH BASE™, a software programme developed by the International Centre for Living Aquatic Resource Management (ICLARM). Furthermore, Bell & Mulipola (1995) have documented the status of important marine and fresh-water fishery resources (fishes and invertebrates) of Samoa.
- A status report of reef fishes undertaken in 1991 by Samoilys & Carlos and highlighted a reduction in biomass and size of fish in shallower and more heavily fished areas, while high biomass was found in less fished and deeper reef slopes.
- A study by Horsman and Mulipola (1995) has documented the dramatic decline of inshore fisheries as noted by the reduction of artisanal and commercial annual landings. Zann and Mulipola (1995) suggested that the declines in fisheries landings were attributable largely to environmental degradation and habitat loss, overfishing of stocks, using destructive fishing methods and reduction in fishing effort.
- A survey by Green (1996) of seven sites on Upolu island, observed an increase of fish species richness with depth. The survey results are tabulated as follows.

Table 12: Fish communities and habitat characteristics at survey sites on the island of Upolu. (source: Green 1996).

Site	Area surveyed	Fish	Fish	Fish	Coral

		species richness	density	biomass	cover
Faleasi`u	Reef front, Depth: 10 m	Moderate	moderate	low	moderate
Vaitele	Reef front, Depth: 10 m	Moderate	high	moderate	high
Fagaloa	Reef front, Depth: 10 m	Moderate	moderate	moderate	high
Eva	Reef front, Depth: 10 m	Low	low	low	moderate
Lefaga	Reef front, Depth: 10 m	Moderate	moderate	moderate	moderate
Sa`anapu	Reef front, Depth: 10 m	Moderate	moderate	low	low
Poutasi	Reef front, Depth: 10 m	High	high	moderate	low

- A fisher creel census that was conducted on Savaii in 1996-97 indicated the dominant species in catches as well as species that were captured in large quantities in only a few areas such as the southeast and the northwest regions. The same study showed that much of the harvested catch was below the minimum legal sizes allowed under the Fisheries Regulations of 1995.
- The Fisheries Division implements ongoing monitoring programmes to determine the status of fisheries from landing catches annually as well as monitor the status of any fishery that is exploited as well as habitats. Of the total fisheries exports in the year 2000, more than 80% were tuna fish species of which albacore (*Thunnus alalunga*) accounted for about 90%. A Fish diversity study has also been undertaken involving 800 fish species.
- In 1998, a pilot Village Level Coral Reef Monitoring Project (VLCRMP) was initiated in collaboration between the Fisheries Division, the Division of Environment & Conservation and the International Ocean Institute – Pacific Islands. The project provided monitoring equipment and assisted in training Fisheries and Environment staff in scientific monitoring methodologies. In turn, the staff trained 46 villagers from six villages of the islands of Upolu, Savai`i and Manono Islands
- Several initiatives have been undertaken to assess the status of coral reefs such as the Marine biodiversity assessment conducted by the IUCN-Marine Protected Areas Project and with the Global Coral Reef Monitoring Network (GCRMN) partnership. Initial assessments of many community-owned marine protected areas indicated tremendous coral recovery and growth following the cyclones of the early 1990s. The conditions of coral reefs at the Aleipata and Safata areas, managed under the International Union for the Conservation of Nature (IUCN) sponsored Samoa Marine Biodiversity Protection and Management project have also shown remarkable recovery.
- A turtle conservation programme has been instituted nationally through regulations prohibiting turtle harvesting for commercial purpose. However, traditional use of turtle is allowed for turtle with carapace length above 72 cm. To further understand the movements of turtles in Samoa in order to facilitate developing appropriate conservation mechanism, a tagging programme was initiated by South Pacific Regional Environment Programme (SPREP) in 1995
- An AusAID funded Samoa Fisheries project in 1995 addressed the issue of rapidly depleting inshore fisheries resources and adopted a community-based approach to subsistence fishery management. Thirty percent of Samoa's approximately 230 coastal villages now have village fishery management plans whereby practical and

appropriate strategies are identified and implemented to achieve sustainable exploitation and management of the inshore fisheries.

Table 13. Subsistence fishery estimated catches and catch rates

Yearly period	Subsistence fishery catch estimates (t/yr)	Catch rate (kg/person/hr)	References
1983-1984	7,164	1.30	Zann *et al* 1984
1990-1991	7,800	0.80	Zann 1991, Mulipola 1991
1996-1997	7,200	2.10	Zann 1997, Mulipola, 1997, King & Faasili 1998
2000-2001	7,167	2.30 2.80 (had management plan) 1.80 (no mgmt plan)	Passfield & Mulipola 2001

Under the AusAID funded Fisheries Extension project 70 coastal villages have established community owned marine protected areas.

- Under the Village-based Management Plans several coastal communities have identified protecting mangroves as one of the habitat management undertakings. Presently about 27% of communities with community-based management plans have opted to impose proper actions to manage activities adversely impacting on mangroves. In the mid 1990s, the Government of Samoa implemented several management efforts to ensure that mangroves, which were essential areas for fishery were fully recovered and well managed. Two large mangrove areas were declared as national reserves. The wetlands within the Aleipata and Safata districts are in the process of being made reserves under the IUCN sponsored Samoa Biodiversity Management project.
- A management directive issued by the Cabinet of the Government of Samoa in 1997 resulted in the total ban on the commercial harvesting and exporting of any ornamental fish from Samoa. The management regime was instituted as a support for the Year of the Coral Reef Initiative in 1997 in the Pacific.
- Aquaculture is widely recognised as a viable means for increasing fisheries production, providing additional protein for the local population and a means of generating income. The Fisheries Division invested in an AusAID-sponsored hatchery now used for bivalve seedling production and propagating for potential fauna and flora. A total of about 15,000 giant clam seedlings were produced and distributed to over 50 village lagoon nurseries in 2001.

7.4. Legislative framework

There is a need to co-ordinate and combine many sections relevant to marine resource conservation and management that are scattered in different legislation. A comprehensive guide will assist the public, communities, responsible agencies and resource users to understand the law better and to manage the resources effectively.

- The National Parks and Reserves Act 1974 provides empowering legislation for the establishment of Marine Parks and Reserves. Marine Parks are characterised as public lands of 600 hectares or more, or islands to which the public is guaranteed

freedom of entry and access subject to any controls necessary for the preservation of the park's features. Reserves (which may be nature reserves, recreational reserves, historic reserves, or 'others') may include areas of territorial sea, although customary fishing rights are guaranteed, and the Minister of Agriculture, Forestry, Fisheries and Meteorology may restrict access to and activities within them.

- The Fisheries Act 1988 governs issues relating to the marine resources. It has three important parts relevant to marine conservation and monitoring. Part II, sections 3 & 4 gives the scope of the Act and prohibits certain fishing activities. Part IV, section 10 authorises scientific research with approval of the Minister. Part VII, section 25 provides for Regulations to be made to, *inter alia*, to regulate and manage any fishery, control harvesting methods, prevent marine pollution and regulate aquaculture activities. The latter part has provisions, which allow for the formulation of Fisheries Regulations and various Village By-laws.
- The Fisheries Regulations stipulate specific management strategies, which specify size limits of fish, and invertebrate species that can be legally harvested.
- Village by-laws are village rules and are accorded legal recognition under provisions of the Fisheries Act 1988. Villages' by-laws are a set of rules created by the people of the communities, which represent all sectors promoting management of both the coastal fisheries and habitats within their traditional fishing area. A total of 57 village by-laws have been formulated and are currently enforced by communities. The shortcoming of Village Bylaws is that they only cover people of that village. The village council cannot arrest neighbouring villagers fishing in their traditional fishing grounds, as that would contravene the "public land section" of the Constitution (Skelton and South, 1998). Some examples of village regulations and actions are listed in Table 14.

Table 14: Community actions and regulations in villages in Samoa. Figures in the right-hand column indicate the percentage of all villages using the particular action or regulation (source: King & Faasili, 1999).

IMPOSED ACTION/REGULATION	% of villages
Banning the use of chemicals and dynamite to kill fish	100%
Banning the use of traditional plant-derived fish poisons	100%
Establishing small protected areas in which fishing is banned	95%
Organizing collections of crown-of-thorns starfish	79%
Enforce (national) mesh size limits on nets	79%
Banning other traditional destructive fishing method (e.g. smashing coral)	77%
Banning the dumping of rubbish in the lagoon waters	76%
Banning the capture of fish less than a minimum size	45%
Banning the commercial collection of sea cucumbers	40%
Banning the removal of mangroves (in villages with mangroves)	29%
Banning the use of underwater torches for spear-fishing at night	26%
Banning the removal of sand	19%
Placing controls or limits on the number of fish fences or traps	13%
Prohibiting the collection of live corals for overseas aquarium trade	<10%
Banning the coral-damaging collection of edible anemones (*Actinaria*)	<10%

- The Lands Surveys and Environment Act 1989 encompasses natural resource protection, environmental management and pollution control. The Act is the mandate of the Division of Environment and Conservation, which has two main sections: *Environmental Management, Planning and Education* and *Biodiversity, National Parks and Reserves.* The Division of Environment and Conservation supervises environmental management activities of other departments, monitors and controls coastal pollution and the effects of climate change on key coastal ecosystems (including coral reefs and mangroves) and oversee natural resource management

such as sand mining. It also has the principal responsibility for the management of parks and reserves (including the Palolo Deep National Marine Reserve).

7.5. Coordination and Decision making

- The need to develop long-term management regimes is very important for the future sustainability of the marine resources and environment. The implementation of management and monitoring regimes has been prompted by the need to rehabilitate Samoa's exhausted fishery resources and improve the environment. Several endeavours have been pursued via management policies and regulations, community-focused strategies, practical management tools, community participation and monitoring activities.
- In 1999, a co-management regime was established aimed at improving awareness of users pertaining to fisheries resource management issues and providing the opportunity for all stakeholders to have direct input into the fisheries management decision-making process. Representatives of all sectors of the industry are represented on the Commercial Fisheries Management Advisory Committee (CFMAC), a forum where issues relating to the industry are discussed. As a result of this interaction and consultation with the stakeholders, greater awareness, acceptance and ownership of fisheries management arrangements have been achieved (Watt 2001).
- To address the declining catch rates and maintaining the economic sustainability of tuna longline fishery, a tuna management plan has been formulated which limits the number of vessels over 10m in length. The commercial tuna fisheries co-management plan encouraged the participation of all stakeholders in the management process and promoting strategies to sustainably utilise tuna resources and maximising benefits. The present capacities required for the proper monitoring of the status of tuna resources have been greatly enhanced
- The participation of villagers in monitoring and management activities is paramount and is presently encouraged through the Fisheries Division Community-based Fisheries Management Plans. Furthermore, recently approved national fisheries regulations and village by-laws facilitate and strengthen the management of coastal fisheries. Community-based marine protected areas are expected to facilitate the rehabilitation of coastal fishery resources through larval dispersal (King & Faasili 1997). Although the community-owned Marine Protected Areas are small in size, they are large in numbers, often with small separating distances, which form a network of fish refuges around the coast. Such a network may maximise linking of larval sources and suitable settlement areas and provide the means by which adjacent fishing areas are eventually replenished with marine species through reproduction and migration (King & Faasili, 1998).
- The IUCN is currently working with the Division of Environment and Conservation and the Fisheries Division of Samoa in identifying and establishing conservation areas in Samoa, under a 5-year project called, *Samoa-Marine Biodiversity Protection and Management*. The project is using a community-based platform similar to the Fisheries Village Extension Programme. The goal is to provide for the protection and sustainable use of threatened coastal marine biodiversity in Samoa. Its objective is to empower local communities at the Aleipata and Safata districts to effectively protect and manage coastal marine biological diversity and to help them achieve sustainable use of marine resources.
- Samoa is a part of the established South-central Pacific Node under the Global Coral Reef Monitoring Network (GCRMN). The Samoa National Coral Reef Taskforce (SNCRT)was recently formed and its members comprised of local NGOs, FD and DEC Government agencies, diving operators and volunteers of whom shared the common interest of protecting Samoa' coral reefs. Information collected from the

monitoring programme will be fed directly into the Node Centre, co-ordinated by the International Ocean Institute – Pacific Islands at the Marine Studies Programme of the University of the South Pacific, as well as kept in the Fisheries Division. The current status (recoveries, impacts, bleaching, etc.) of the coral reefs in Samoa will be reported in a timely manner and contrasted globally.

7.6. Capacity building

- The Village Fisheries Extension Programme is a community-focussed fisheries project, which encourages villages to define key problems, discuss causes, propose solutions and take appropriate actions. Information at each of these stages is provided by various village groups, including women's groups and untitled men's groups, and is recorded by trained facilitators. The Fisheries Division (FD) provides technical advice on how to care for the marine environment and the development of alternative sources of seafood. The Research Unit within the Fisheries Division undertakes surveys of Fish Reserves in participating villages. A general baseline survey of the area normally takes into account the physical characteristics of the proposed reserve as carried out by staff of the Fisheries Division who have been trained in scientific monitoring methodologies at marine institutions abroad.
- Under the Village Level Monitoring programme several communities have members that are now equipped with the monitoring techniques and they collaborate with staff of the FD implementing the monitoring of coral reefs in the established community-owned fish reserves.
- The IUCN Marine Protected Areas project provides the village communities with the opportunities to plan and manage their resources, implement alternative income generation activities as well as build capacity and enhance environmental awareness.
- The Mulinuu reefs was one of the most badly affected areas during cyclones. A manta towing technique and under water visual census (UVC) were conducted on the Mulinuu reefs by South and Skelton (1998) on the Mulinu`u reef as part of the Fisheries Division capacity building in 1998.

7.7 Research

Evidence from scientific and technical research has further augmented resource management with the application and revitalisation of traditional management regimes. Again, through scientific and technical applied research, outcomes have effectively assisted in the implementation of appropriate management plans ensuring sustainable exploitation and management of highly commercial fisheries.

7.8 Challenges and issues

- There is limited expertise in some specialised areas relating to resources management even though the increase in qualified personnel in responsible agencies, timely actions and communication with regional and international organisations means the promotion of marine management and conservation efforts have been greatly improved.
- The promotion of research must be encouraged as it is difficult to manage resources without understanding the overall process
- The use of legislation to regulate fishing and promote research, development, conservation and monitoring efforts must recognise the *fa`a Samoa* (Samoan way of life). The need for legislation to be formulated with the involvement of the people from the beginning is important and laws need to be practical and enforceable.
- The proper management of the marine resources of Samoa is improving mainly due to the harmonising of national laws and customary systems. The Government has

recognised the importance of involving the village chiefs and the public in management and conservation efforts and there is a need to replicate this process across the country.
- There is a need to co-ordinate and combine many sections relevant to marine resource conservation and management that are scattered in different legislation. A comprehensive guide will assist the public, communities, responsible agencies and resource users to understand the law better and to manage the resources effectively
- The need to develop long-term management regimes is very important for the future sustainability of the marine resources and environment. The implementation of management and monitoring regimes has been prompted by the need to rehabilitate Samoa's exhausted fishery resources and improve the environment.

7.9 The Way Forward

The status of coastal resources and the marine environment of Samoa has improved substantially over the past decade due mainly to several management and conservation strategies that have been established in recognition of the protocols agreed during the first Earth Summit in Rio. However, there are areas that need further improvement and immediate actions. Likewise, there are options for local fisheries to focus on in the future in order to encourage and achieve sustainable resources exploitation and management.

7.9.1 Management, conservation and monitoring activities

- Strengthen existing management regimes as well as revitalise traditional ones through consultation and collaboration with stakeholders. The formulation of such regimes must be based on scientific evidence and precautionary approaches.
- Involve stakeholders in programmes and activities to monitor and collect catch and effort information concerning fisheries resources.
- Broaden and strengthen awareness of fisheries issues
- Monitoring of stocks and habitats through timely and effective assessment methods and management;
- Adopt and adapt relevant mechanisms promoting coastal resources management relating to climate change, rising sea level, temperature increase, land pollution, etc.
- Biodiversity conservation
- Develop mechanisms to prioritise and put more emphasis on the protection and conservation of coastal lagoons and habitats and remaining mangrove and wetland areas.

7.9.2 Management and conservation regulations and policies

- Develop and implement an Integrated Coastal Management (ICM) National Plan, which should define the roles of Government department, local NGOs and regional/international NGOs, as well as including a summary of all relevant legislation dealing with marine resource conservation
- Encourage the formulation of National Sustainable Development and Resource Management legislation, which should restate and reform the law relating to *inter alia* the use of marine and coastal resources;
- Implement regulations requiring resource users, especially fishers, to provide catch and effort information
- Develop regulations to promote responsible fisheries: fishing gear types, catch and release regulations for protected marine species, regulations concerning the handling of by-catch species.

7.9.3 Capacity-building and Institutional strengthening

- Efforts be made to enhance and build human resource development, which must include specialised training and higher levels of education in fields that are non-existent in the fisheries sector.

7.9.4 Aquaculture

- Strengthen aquaculture development with a clear focus on resource enhancement and food security.
- Develop aquaculture technical skills to improve rehabilitation of coastal resources
- Move towards more intensified, diversified and sustainable aquaculture.

7.9.5 Sustainable exploitation of fishery resources

- Research and develop potential and underutilised fisheries and determine level of sustainable exploitation.
- Establish relevant management plans based on scientific and economic viable reasons.

CHAPTER 8 FRESH WATER RESOURCES

8.1. Context

Although Samoa receives high rainfall, water resources usually dry up 3 to 6 months of the year as a result of the high permeability of younger rock formations. During this time, only three major rivers run and these have been fully developed for water catchment. Cyclone damage and continuing land clearance were the major threats affecting the ability of water catchment areas to hold water as well as the quality of the water from the remaining streams.

This was evident from the traces of certain chemicals found in shellfish from Vaiusu bay. A project on Apia sewerage (GWS, 1993) looked at the contamination of freshwater discharges from sewage. One of the findings of this study concluded that sewage contamination of natural surface flows reduced the natural environment values of the freshwater habitats. Government attempted to protect catchment areas, however, large parts of these areas were already cleared for plantations. In the Apia urban area, water quality declined during this period because of greater runoff from cleared catchment areas. Although there was a new (and costly) water supply for the town area, there were still frequent shortages and dirty supplies.

About two thirds of the population had access to water drawn from surface resources, the other third relied on bore water or rainwater (Taule'alo, 1993.). Samoans have always regarded water as a gift from god and accordingly, they expect that it should be free. There is concern about the excessively high consumption of water as a result of inefficient use of existing supplies and supply leakage. For example, while the normal requirement is 250 litres per person per day, the Public Works Department has reported rates of use totalling 600 litres per person per day in the Apia area alone.

Hydroelectricity generation accounted for about 50 percent of electricity production on Upolu. Before the commissioning of the Afulilo Hydroelectric scheme in July 1993 hydroelectric power was generated from small 'runs of the river' plants. Afulilo is a water storage scheme consisting of an impoundment in the upstream plateau of eastern Upolu and a power station at the coast of Fagaloa bay. There is a need to balance the water needs of hydroelectric generation, public water supply and environmental conservation.

8.2. National actions and achievements

- Samoa's first National Biodiversity Strategy & Action Plan (GOS, 2001b), includes a theme on ecosystem management, with specific actions to extend the watershed

programme to all priority areas and smaller village-based water catchment areas. An additional action under this theme looks at the restoration of degraded ecosystems including watershed areas.

- The Afulilo Hydroelectric Project is currently undergoing an augmentation phase that would increase its power output. From the outset of this project, visible impacts on the water quality of the Fagaloa bay have been noticeable. These have been a result of discharges from the associated power plant along the coastline. Sediments have contributed to the discolouration of the Fagaloa bay. Anecdotal evidence suggests that the quality of the discharges deteriorate particularly during the dry months from May to October.
- Overseas development assistance has helped in major projects for the management of water resources. Current donor assistance includes the European Union, Germany, Australia, New Zealand, and Japan. Furthermore, technical assistance has been received from the ADB, FAO, WHO, UNEP, through the UNDP, and the South Pacific Regional Environment Programme (SPREP). The Samoa Water Authority in 1999 embarked on a rural water supply project through funding assistance from the European Union (EU). This project is being implemented at a cost of $54 million.
- The International Waters Programme (IWP) funded by the GEF recently commenced for Samoa. The GEF is providing US$12 million over a period of 5 years to implement this project, which integrates the ocean with rivers, lakes, groundwater systems, wetlands, and coastal zones. The stated objective of the programme is to facilitate action at the community level in three areas, one of which is freshwater quality. To achieve this, a pilot project under this programme is currently in the planning stages to address the protection of Samoa's freshwater resources.
- A water-metering programme for the whole country commenced recently. One of the aims of this programme is to curb the misuse of water given that Samoa has one of the highest water consumption rates in the region. Reti (2000) mentions that while awareness-raising campaigns have been carried out, water use per capita in Samoa remains exceptionally high and unsustainable in the long term. One reason for this trend is attributed to the local attitude towards water as a "free gift from god"
- The Samoa Water Authority recently completed a water-chlorination scheme for the greater Apia water Supply. Thus, the water supply in the capital is now treated.
- The National Environment Management & Development Strategies (NEMS), approved in 1993, was seen as a comprehensive approach to addressing environmental issues in Samoa. The protection of the quality and supply of fresh water was identified as one of these issues. Hence, a draft National Water Policy was formulated to address this issue and has been revised over the years to accommodate emerging issues related to the sustainable conservation and use of water resources. The draft Policy that is now awaiting official approval provides a framework for the conservation, sustainable use, and management of water resources. (GOS, 2001c), and furthermore, promotes and facilitates a system of collaboration between various stakeholders. Two strategies are outlined in the Policy, and these relate directly to capacity building, strengthening existing legislation, strengthening public awareness, and multi-sectoral co-ordination in relation to water resources.

8.3. Institutional framework

The Samoa Water Authority (SWA) was formally established in late 1993. This entity is in charge of all matters relating to the provision of a water supply of suitable quality, and adequate quantity, to the country. The Authority operates as as a government owned corporation with the duty to obtain, store, purify and reticulate water supplies throughout Samoa. Thus, the SWA is the national service provider for water resources. It should be noted that there is still no Agency formally responsible for the regulation of water

resources. The SWA co-ordinated a working group to draft and complete national drinking water standards for Samoa in 1999. This working group used a number of parameters to determine acceptable standards for daily human consumption. For some of the constituents considered, World Health Organisation standards were adopted. The Department of Health is responsible for the safety of water supplies.

Sections 31 and 32 of the Water Act 1993/94 administered by the SWA have a Notice of repairs. These sections state that the public is required to maintain water pipes and appliances in good condition. Failure to do so will result in prosecution and liability to a fine of $1000 pursuant to section 76 of the Act. An additional fine of $100 is charged for each day that the offence continues. If within two weeks repairs are still not carried out, and water is still being wasted, the supply in question will be cut off.

The Authority owns and operates a range of assets from raw water intakes, treatment plants, bore supply systems, transmission and reticulation pipe systems and customer connections and meters. It derives the majority of its income from tariffs charged to customers as well as charge for water testing and analyses services provided to outside organisations. Revenue fro water supply and ancillary services are insufficient to cover the basic operating costs of the organisation so it relies on a financial contribution from the Government. Certain water supply services' revenue performance cannot be brought within a commercial range hence such services equate to community obligations. Improvement of the business efficiency of the Authority is being addressed under an AusAID funded institutional strengthening project.

8.4 Challenges and issues

The main challenges currently facing water resources include:

- Fragmented control, management and protection of water resources WITH BOTH THE Department of Lands and Environment and MAFFM having catchment responsibilities and little coordination between water users such as the Samoa Water Autrhoity and Electrci |power Corporation
- Competing excessive and conflicting demands for water resources by users (both consumptive and non-consumptive users).
- Insufficient knowledge and understanding of water resources and responsible management nationwide.
- Social and environmental impacts of development proposals particularly abstractions are usually ignored.
- Poor water quality
- Limited community involvement in water resource management.
- The degradation of watershed areas, largely through deforestation and land clearanc e
- Complete national coverage of the country with potable water supply

8.5 The way forward

- More awareness on the need to protect watersheds is needed especially with regard to solid waste and sewage disposal. Programmes should be designed to gauge the level of awareness concerning this issue.
- Communities need to be consulted fully and given a role of active involvement in the management of water resources. The wise use and protection of water resources should be addressed at the village level through traditional governance mechanisms (village fono/council).

- Water resources should be conserved in partnership with all stakeholders. Through such a collaborative effort, the conservation of all fresh water bodies will be more integrated. It is envisaged that the sustainable utilisation of water resources will be achieved in this way.
- There is a need to protect water resources from the adverse impacts of human activities. The 1998 EIA regulations need to be enforced, in order for water abstractions and associated developments to be sustainable in the long term. Hence, the formal approval of the regulations coupled with the strengthening of the regulating agency (DLSE) to fully implement the regulations should be a high priority.
- Large-scale utilisation of water resources (i.e. – hydroelectric projects) needs to be fully investigated for feasibility and sustainability prior to implementation. Hence, such developments need to be subject to appropriate environmental standards, and, EIA procedures need to be tailored specifically to address developments of such scale and nature.
- There is a need to improve knowledge and understanding of water resources which are essential for long term planning and responsible decision making. Although baseline information on the hydrology of Samoa already exists (Kear and Wood, 1959), neither a comprehensive study of water resources has been carried out, nor do any water resources management strategies exist. Hence, detailed studies on water flows across different water catchment areas is required and such studies need to be developed in order to update the current state of knowledge and understanding.
- There is a need to develop pricing mechanisms to control the allocation of water. Currently, access to water resources is free; consumers are only charged for the cost of their water supply. There is no incentive for service providers to use water efficiently. Hence, service providers should be required to develop equitable mechanisms for allocating water to various users.
- There is an urgent need to consider the development of a national Master Plan for water resources in order to address the fragmented approach to managing water resources. This fragmentation was thought to have contributed to a lack of understanding of related issues and the waste of water resources.

CHAPTER 9: BIODIVERSITY RESOURCES

9.1 Context

Samoa's terrestrial resources form an important cornerstone of the nations' livelihood. In the past, the utilisation of some of these resources has mainly been for the purposes of subsistence. However, as with the realities of any cash economy today, the development of some of these resources for commercial purposes has become commonplace. Thus, there has been further emphasis on the sustainable use and development of these resources, taking into account the fact that our islands have a limited resource base.

.9.1.2 Fauna

The Samoan people rely heavily on biological resources for their economic, social and cultural wellbeing. The use of natural resources for food, artisanal and medicinal purposes is an essential expression of the Samoan culture. The challenge is to achieve protection for biodiversity resources within the context of sustainable use and is best done with the cooperation of those living in the area and use the resources.

9.1.3 Conservation strategies

Increased demand for land and forest resources put tremendous pressure on natural ecosystems, threatening the survival of existing terrestrial fauna. As in the conservation strategies for plant species and vegetation, the same critical sites were also vital habitats

for animal species. It was proposed in the Forest Policy document (GWS 1993), that for the implementation of the network of conservation areas would further strengthen the conservation of plant and animal habitats. This network includes many of the lowland areas identified by Park et al. (1992), and highland areas identified by Pearsall and Whistler (1991).

9.1.4 Flora

Several studies and developments in the twentieth century especially in the second half of the century have produced a fairly comprehensive understanding of the status of the flora of Samoa and the priority issues regarding its preservation and contribution to social economic development. It was confirmed then that like its sister island states in the Pacific, its geographical isolation from continental land masses and its vast distance from neighbouring island states have made it possible in the past to evolve a significant percentage of plant species endemism with a wide range of indigenous vegetative systems. It was also ascertained that in about one and a half thousand years in the past the Samoans have developed an indigenous culture that was rich in the use of plant species for shelter, tools, mobiles, ornamentations, food and cures for various kinds of physiological and psychological illnesses.

By the turn of the century there was an obvious increase in the local and international communities interests in the social and economic value of some of the native species of Samoa's flora. Simultaneously there was also a corresponding increase in the appreciation of Samoa's traditional knowledge and practices with the use of native and introduced plants, especially in the field of medicine. While important developments were initiated as the century ends that will provide the tools for the preservation and development of the social economic potentials of Samoa's flora, old and new unsustainable practices continue to undermine the viability of its remaining habitats.

At the beginning of the last decade it was understood from several scientific studies that there is nearly 500 species of native flowering plants and about 220 species of ferns in 96 families and 298 genera of Samoa's flora, making this one of the most diverse flora in Polynesia [SBSAP, 2001]. Overall about 25% of the native plant species are endemic to Samoa and 32% are endemic to the Samoan archipelago. There is one endemic genus, *Sarcropygme* (Rubiaceae) with two species. Around 136 native plant species were considered threatened or endangered [SBSAP, 2001]. A further 500 or so species of plants have been introduced to the islands since the first Samoans brought the coconut, taro and other species for cultivation. While some of these plants are beneficial for agriculture, others have become destructive weeds. The fern life of Samoa's flora in particular was very well comprehended through the work of several scientists [SOE, 1993].
In terms of their traditional use some important documentation were available which discuss the use of native plants for traditional medicines and healing rituals that were strongly practised side by side with modern medicine (SHM, 1996).

It was very clear by then that much of the threats to Samoa's native flora were due to the depletion of tropical rainforests through commercial logging and agricultural practices. With the severe impacts of the two devastating cyclones at the beginning of the decade, it was seen then that it would be extremely difficult and may even be impossible for the country's native flora to regenerate to its former state it had at the beginning or even in the middle of the last century. Coupled with the continuing introduction of exotic species in which several have spread as invasive species or pests it further discouraged efforts to maintain the remaining sites of native flora.

Much of the developments at the time, which appreciate the value of the native flora, were largely based on their traditional and modern social economic value. Hence more

attention was placed on economically valuable species such as timber trees, food crops, ornamentals, and plants for traditional medicine and healing practices. Research and development activities of the government agencies and private groups then were likewise aimed at cultivating and protecting economically viable plant species. There was no in-country attempt to explore the potentials of native or more precisely of endemic species to any of the social economic developments. By then, only the native shrub 'ava' *Piper methysticum* was accorded some recognition with the increase of its raw export overseas for the production of a valuable relaxant.

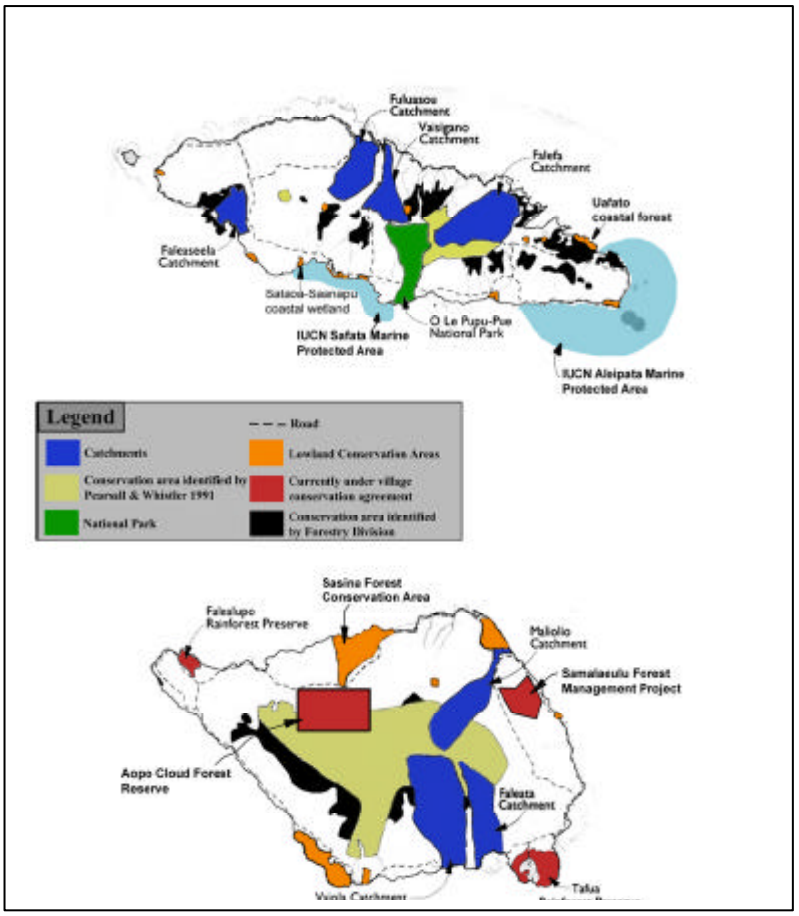
9.1.5. Vegetation

Although the study of Samoa's vegetation is very recent, much is known of it and its structure was well defined at the beginning of the last decade. However, the majority of the country's grassroots do not appreciate this modern comprehension of the country's vegetation. They have from the past established a simple method of differentiating vegetation based on what is dominant in an area or on its usefulness. Past studies have resulted in a structure of the country's vegetation which recognised ecological potential in relation to other countries with concomitant recommendations made for its protection and development.

The vegetation was divided into 19 plant communities in five broad categories: littoral vegetation, wetland vegetation, rainforest, volcanic scrub and disturbed vegetation. Much of the littoral vegetation consists of four communities of vegetation, situated on the seashore have been lost or degraded. The best remaining examples are at Aleipata Islands, O le Pupu-Pue and sites on the southern central coast of Savaii. There have also been serious losses of wetland vegetation communities such as: coastal marsh, montane marsh, mangrove scrub/forest and swamp forest, particularly in the lowlands. Four communities are recognised on an altitudinal gradient for rainforests: coastal, lowland, montane and cloud forest (restricted to Savaii). The few remaining significant areas of coastal forest are at the Aleipata Islands, Apolima and the Tafua Crater. Fourteen lowland forest sites were surveyed by Park et. al. (1992) who identified 14 as the minimum needing protection to achieve adequate representation of this habitat. Montane and cloud rainforests have been mapped. Volcanic vegetation composed of two communities, lowland volcanic scrub and upland volcanic scrub; occur only on recent lava flows on Savaii. Four communities of disturbed vegetation derived from a combination of human activities and weather include managed land, secondary scrub, secondary forest and fernlands [SBSAP, 2001

9.1.6 Forests

At the beginning of the decade deforestation was identified as one of the key environment and development issues in the country (NEMS, 1993). Timber production and agriculture remained the main consideration for the utilisation of the remaining indigenous rainforest and the development of exotic forest plantations at the beginning of the last decade. However, with the



impact of cyclones and the rising public concern with the degrading consequences of forest clearance, this development focus was challenged and the direction of the Government's forest development programme was refined in order to reflect the dominating environmental considerations of the times. Towards the end of the decade, the focus of forest development shifted from reafforestation to watershed management, community forestry and sustainable indigenous forest utilisation. The Government's reafforestation activities were closed down in all leased village lands (customary owned lands) except the maintenance of established plantations on Government lands in Savaii and vegetative replanting on two of the country's major water catchments. A proposal is under consideration for a re-organisation of the Government's agencies with major responsibilities in forestry conservation and development in order to improve their coordination and optimise their use of available resources.

About a third of Samoa's native forest trees are used commercially for timber, mainly as building materials for houses and for general construction work. Certain hardwoods are used for carving traditional handicrafts such as Samoan war weapons and tools. Almost all are used as firewood. Several of these native tree species are of the highest quality timbers by international standards. A national grading rule and a guide for specifying timber and wood-based products that were prepared by the Government in the '80 still remained un-enforced let alone promoted.

Since most of the country's native flora and fauna species are found in the rainforests, the depletion of the latter decreases the viability of continued existence of such species. Several endemic birds species are now believed to be near extinction. Moreover, native rainforests covers the country's major water catchments and their destruction have dramatically reduced water supply and river flows throughout the country and is the most

common cause of severe flooding and soil erosion during the last two decades of the century.

The management of the National Park and all state Reserves is the responsibility of the Division of Environment and Conservation. The main challenge in addressing forest clearance was dealing with the village communities, which controlled the remaining merchantable forest areas of the country. Confusion in the application of legislations with respect to this change of responsibilities arose when DEC tried to prosecute villagers who had illegally encroached on the Government's established Reserves. This situation was an example of some gray areas in the roles of DEC and those of other traditional agencies such as the Forestry Division with similar responsibilities for the development of the country's forest and land resources. The sharing of expertise and resources between the agencies to address forest development issues have helped clarified matters and strengthened their cooperation.

9.2.0 National actions and achievements

9.2.1 Coastal resources

- The World Bank funded Infrastructure Asset Management Project (IAMP) that started in 1998 focuses on the protection of government infrastructure located along the coastal fringes of the country, especially roads. The project provides for the creation of a Coastal Infrastructure Management Strategy (CIMS) which has the objective to"…provide direction for government planning and project development in the coastal environment". (GOS, 2001a) The implementation of the strategy at the local level (within districts) is addressed through Coastal Infrastructure Management Plans (CIMPS) to cover the whole country. The role of these plans is to provide guidance at the local level for the implementation of the principles and directions of the strategy (GOS, 2001a).
- Systematic appraisal procedures for public sector development projects did not exist before 1997 and 1998. Any such attempt was usually fragmented and uncoordinated. Hence, obvious and potential environmental impacts of major land-based public sector projects were either overlooked, inadequately assessed, or ignored altogether. Draft Environment Impact Assessment regulations were formulated by the DLSE in 1998.These regulations basically require all proposed developments, to be subject to Environmental Impact Assessments. The regulations built upon the incorporation of environmental considerations throughout all stages of the project cycle (from planning to implementation). Although still in draft form, there has been strong political support to see these regulations implemented. Hence, they have been used in the planning stages of activities under the IAMP project (PWD coastal protection works) and in various Fisheries Division sub-projects (AUSAID Samoa Fisheries project, 1999), among others.

9.2.2 Fauna

- The adoption of the National Environmental Management Strategy in 1993 addressed the protection of natural biodiversity and provided strategic objectives at national level.
- A survey on the biological diversity in upland ecosystems of Samoa was carried out in 1996 (Schuster et al., 1999). The main objective of this survey was to conduct an ecological survey of mid-slope and upland forest, with a view of identifying key sites of significant size. The subsequent conservation of these sites would inevitably benefit the full range of habitats that they contain, and in the long term, ensure the survival of species and genetic diversity.
- The Upland Ecological Survey (Schuster et al., 1999) and other monitoring counts carried out by the Division of Environment & Conservation (DEC) revealed that all of

the 14 “rare or endangered” species mentioned above are still present and most to be increasing in number, although slowly. The friendly ground dove or Tuaimeo (*Gallicolumba stairii*) is of most concern, apparently almost extinct on the two main islands and found only on two offshore islets.

- Public awareness campaigns were carried out to increase the appreciation of the functions and benefits of various native and endemic bird species to Samoans following the same approach taken in previous campaigns (i.e. The manumea campaign of 1992, Year of the turtle, Year of the Coral Reefs).
- A brief study of Samoan insects and other arthropods (Kami and Miller, 1998) revealed an overall listing of 2523 species of insects and 251 species of other arthropods, but mention that these figures underestimate the total number of species in Samoa.
- In 1999, Samoa received funding approval for its Biodiversity Enabling Activity to develop a National Biodiversity Strategy & Action Plan (NBSAP). The NBSAP addresses all crucial issues related to the conservation and sustainable use of Samoa’s biological resources. One component of the NBSAP specifically addresses the review of current information available on Samoa’s biodiversity while simultaneously identifying gaps in the information that need to be considered for further research. One of the aims of this exercise was to compile all the existing information on Samoa’s biodiversity.
- Bird surveys showed that thirty-five species of land birds and Twenty-one Sea and shore birds have been recorded from Samoa. Ten of the land birds are endemic at the species level or sub-species level while four species have been introduced. The most recent introduction, the common myna bird (*Acridotheres tristis*), was released in Apia in the late 1960’s to control livestock ticks and has since spread through the cultivated areas on Upolu.
- Mammal studies show that there are thirteen species of terrestrial mammals now present in Samoa and of these, only three are native. Two fruit bats (or flying foxes), ‘Pea vao’ the Samoan flying fox (Pteropus samoensis) and ‘ pea fai taulaga’ the Tongan white necked flying fox (*Pteropus tonganus*); and ‘ tagiti’, the sheath tailed bat (*Emballonura semicuadata*). The fruit bats are important for the long-term survival of the forests as they pollinate the flowers of many species and disperse seeds of the fruits that they eat through the forests. Mickleburgh et al. (1993) recognise that one in three Samoan forests depend on bats.
- The introduction of the Nile tilapia (*Oreochromis niloticus*) for aquaculture purposes in 1995 and the recent identification of three species of water eels by the Fisheries Division comprise the only current information available on freshwater fish to date. Apart from this, there is no new information to update the current state of knowledge regarding freshwater fish.

9.2.3. Conservation Strategies

- A comprehensive strategy for the conservation and sustainable use of Samoa’s biological diversity now exists
- An integrated and organised approach to addressing biodiversity issues is in place with the promotion of cross-sectoral collaboration of stakeholders.
- Alien Invasive species are currently being addressed in an integrated manner through the formalisation of a National Invasive Species Committee during late 2001 to collaborate on priority species to be considered for control and/or eradication.
- An updated Policy on Biological Diversity for Samoa has been finalised and submitted for approval.
- The ‘Manumea Campaign’, implemented in 1992, was a species conservation programme aimed specifically at educating the public on the importance and status of Samoa’s endemic bird, The tooth-billed pigeon (*Didunculus strigirostris*).

- In 1999, Samoa received funding approval for its Biodiversity Enabling Activity to develop Samoa's first National Biodiversity Strategy & Action Plan (NBSAP). The NBSAP addresses all crucial issues related to the conservation and sustainable use of Samoa's biological resources.The formulation of the strategy was conducted through a multi- sectoral approach involving all stakeholders with a stake or interest in biodiversity conservation. The Strategy focuses on eight priority thematic areas of focus:

  Mainstreaming biodiversity the integration of biodiversity issues into cross-sectoral legislation, plans and policies in order to promote the conservation and sustainable use of biodiversity.
  Ecosystem management – Looks at preserving Samoa's biodiversity through increasing the percentage of protected and conserved areas. The strategy goal here aims to increase these areas from the existing 10% of total land.
  Species management – Looks specifically at promoting the conservation of native and important species and providing ways and means by which their sustainable use can be achieved.
  Community – Involves the empowering and encouraging traditional communities to protect, conserve, and sustainably use Samoa's biodiversity.
  Access & Benefit sharing from the use of genetic resources - looks at the issue of access and rights to genetic resources with a view that utilisation of these resources are enabled and the benefits derived are shared in a fair and equitable manner.
  Biosecurity- focuses on protecting Samoa's native biodiversity from the impacts of alien invasive species. The strategy here mainly deals with strengthening capacities in border control, quarantine and possible eradication programmes.
  Agro- biodiversity – Looks at the conservation and sustainable use of Agrobiodiversity, which entails the variety of animal, plant organisms etc… that are important to food and agriculture. It is envisaged that conserving Agrobiodiversity will contribute to national development and the preservation of traditional knowledge.
  Financial Resources and Mechanisms – Given that funding is a crucial component to the success of any programme, this theme looks at attaining long term financial sustainability of biodiversity related programmes through accessing and securing funding mechanisms from local and international sources.

9.2.4. Flora

- Activities to promote replanting of native and exotic species mainly to maintain sources of basic social economic needs such as water and soil fertility were started. Among them was the National Tree Planting Day or Arbor Day that was held annually since the late 70's. With very little information on the qualities and value of plants that were distributed for public planting in these campaigns, many of the plants, which were largely timber trees, end up near homes, schools, and other inappropriate places, and were inadequately taken care of. However, these efforts were improved when it was combined with an annual national environment week that was started in 1990 and other successive public education campaigns on various aspects of biodiversity conservation later in the decade.
- With the information gathered the Government established a sophisticated database of plants and animals housed at its newly established environment agency. It listed the names (common names in English and Samoa and scientific names), described the qualities and uses with some photographic imaging of several plant and animal species which were being documented by then. This database was to be developed further with the collection of new and relevant information.
- In term of legislation and policies there was very little in place that specifically dealt with the protection of plant species or their habitats Much of the national legislations

dealt with the protection of forests and wilderness in general with a specific ordinance for the protection of wild animals and together with key recommendations from the latest studies these provided the basis for the establishment of the first series of state parks and reserves for nature protection. The corresponding local authority rulings which were on the rise by then also followed the tone of the national government's regulations, in lieu of the fact that most villages ban the illegal or degrading use of their natural resources. A few villages had these sanctions incorporated into the management of their formally established indigenous forests conservation.

- Existing legislations to quarantine and eradicate the illegal introduction and spread of new species into the country at the time were very weak. There was a prevailing spread of new invasive species and pests, and the cultivation of a wide range of exotic ornamentals and herbs throughout the country in the latter part of the decade. A most debilitating economic consequence of the situation was the onset by then of the taro blight which almost completely wiped out this popular stable and high export earning food crop. Another socially disturbing result of it is the widespread cultivation and sale of the illegal shrub marijuana.
- The Upland Ecological Survey that was started with a pilot survey in 1994 and was followed by a full survey in 1996 [SBSAP, 2001].The results of this survey and together with several new publications towards the end of the decade have shed more light on the status of Samoa's flora, especially its progress since the significant upsurge of public concern with environment protection and conservation at the beginning of the decade, both in lowlands and in the case of this survey in the upland vegetation of the country [SBSAP, 2001]. The results of this major survey showed that of the 136 native plant species that were considered threatened or endangered at the beginning of the decade, only 18 of them were found in sufficient numbers. However, several of these plants were considered endangered and were recommended for immediate conservation. Four new species for Samoa were also found while 10 weed species were identified as having the potential for serious damage, and were in need of priority eradication or control [SBSAP, 1996].
- The Government initiated some species protection activities and became an active participant in regional and international developments for the protection and development of native flora. This was recognised in its commitment to the Convention on Biological Diversity and its related regional and international activities.
- The government established new nature reserves at several sites within and close to urban areas of Apia. Two new Nature Reserves were officially in 2001 and 8 acres of other unused spaces were also reserved [SBSAP, 2001].
- Several village conservation area projects started in the middle of the decade with strong components of native flora and habitat protection. These include the conservation of several tracts of remaining indigenous forests in six villages of the island of Savaii and one in Upolu and mangrove conservation in two villages of Upolu.
- With the completion of its National Biodiversity Strategy and Action Plan last year 2001, steps have commenced to improve the conservation of the remaining native flora and its habitats as well as address the invasive species issues of the country. An interagency steering committee was formed late last year and a pilot survey was conducted earlier this year to address the invasive species problems of the country.

9.2.5. Vegetation

- The 14 ecosystems identified as the highest priority for conservation based on rarity and threats in Samoa consist of mixed upland species swamp forests, xylocarpus mangroves, pandanus turritus swamp forests, freshwater lakes, mixed lowland species swamp forests, herbaceous marshes, rhizophora mangroves, metrosideros montane rainforests, native grasslands, coastal rainforests, ridge rainforests,

bruguiera mangroves, littoral forests, and cloud forests. Twelve of these were considered as having global significance. Twenty six sites were identified for priority conservation of these types of ecosystems.

- The national lowland ecological survey in 1991-1992 however modified these results and selected fourteen of Grade 1 and 2 lowland sites which were regarded as the minimum needed to establish a representative of ecosystems of the lowlands of Samoa and a further 13 of Grade 3 sites. Grade 1 sites include Uafato-Tiavea Coastal Forest; Saanapu-Sataoa Coastal Wetland (Mangrove Forest); Aleipata Islands; Aopo-Letui-Sasina Coastal Forest; and Vaoto Lowland Forest. Grade 2 sites includes the Apolima Fou Coastal Wetland, Saleapaga-Lalomanu Coastal Forest, Vaiee-Tafitoala Peninsula, Vaipu Swamp Forest, Taga-Lata-Salailua Lowland Forest, Siuvao Point and Mulinuu-Tufutafoe rainforests. It also recommended several native plant species for conservation within the ecosystems they are found.
- The second survey following extensive cyclone damage emphasised the urgent need for the implementation of a comprehensive conservation management programme centred around the key lowland sites identified in the national lowland ecological survey [SBSAP, 2001]. With the upland forest ecological survey in 1994 to 1996 (UPS, 1996), further sites of significant conservation potentials were identified and some of the results of the lowland ecological survey were reassessed. The montane forests mapped earlier in the decade [SBSAP, 2001] were surveyed and were considered to have the richest flora of any forest community in the country. On Upolu, no montane sites were found that either had good forest or were clearly recovering (from cyclone damage) and there was much impact from several weeds. On Savaii, the forests are recovering at higher elevations where there is little human activity, whereas the process is much slower in the lower areas where forest cutting has added to the problem. The upland survey visited 13 sites all considered in need of some conservation and identified two large ones (linked to lowland forests) as priorities. The volcanic and disturbed vegetation two other potentially significant areas could not be surveyed.
- New village conservation areas were added during the decade: Aopo upland forest conservation, Faala coastal rainforest conservation, Tafua coastal rainforest conservation, Sasina-Letui-Aopo coastal rainforest conservation(Refer to Map 1). Village community efforts in these and formerly established areas are presently focussed on income generating activities such as ecotourism, honeybee production, and handicraft making. At Falealupo the village with outside assistance constructed the first and only canopy walkway for rainforest flora and fauna watching in Samoa at a cost. A similar project was established at Saanapu – the first mangrove boardwalk in the country. Other villages such as Sasina and Aopo have had ecotour trails and tour guiding in their conservation areas. The interests of foreign ecotourists and scientists in these areas were the main motivation for village communities to continue their efforts to maintain their conservation areas. Presently, more than 20 sites have been registered of tourism significance throughout the country, which include several sites of the defined vegetation types such as the Saleaula Lava Fields and the Mt. Matavanu areas.

9.2.6 Forestry

- The Government's forestry development programme has moved completely away from any further reforestation following the cessation of development assistance by NZODA in the sector. Forest plantations on leased village lands have been all handed back to village authorities and the forestry agency is concentrating on maintaining the plantations on Government lands – mainly in Savaii and its current programmes of watershed management, community forestry and sustainable indigenous forest development.

- Water metering and charges have now been imposed on all public water consumption from the Government's water supply systems, which are mainly coursed from the water catchments of Apia. Plans for another major hydro-electric development are under way, that will be established in the river systems of the largest catchment on the island of Savaii.
- While villages have shifted away from forest plantations, individual farmers are continuing to plant native tree poumuli *Securinega samoana* and the exotic species mahogany. Lands once leased for forest plantations are now being cleared by the respective villages for new settlements and cash crop plantations.
- The Government has participated in two regional programmes: the South Pacific Regional Initiative on Forest Genetic Resources that is discussed under the flora section and the Pacific German Sustainable Forestry Programme. For the latter, a demonstration native forest plot of 500 hectares was established at the village of Samalaeulu in the island of Savaii in 1998. Measurements of the timber stand and development of tree diameter tables were completed. The first sustainable trial logging was set to start in 2000 but was forestalled when differences arose among the landowners on land claims. A new plot was therefore started from last year in the neighbouring village of Pu'apu'a. The lessons learned from this project could be adopted to the current sawmills' operations, especially if they decide to move to the remaining forests (mainly the conservation areas) in the near future
- An inter-departmental economic valuation of biological resources was carried out and demonstrated that 3.2% of the country's GDP can be acquired from goods and environmental services that are generated from the utilisation of the forest and marine resources of the country (Table 15). Moreover, it was noted that the growth of tourism related industries such as hotels and restaurants and associated transport, are partially dependent upon the marine and forest resources that provide the attractions for tourists and eco-tourists in particular.
- The Government approved a new forest policy and a watershed management strategy, and established a water authority institution with the mandate to upgrade its water supply systems to the highest quality possible and charged all public and private water consumption.

Table 15. Economic Values of Samoa's Forests & Marine Resources.

Resources	Goods & Services	Kinds of Value	Economic Valuation Technique	SAT/Year
Forestry	Timber ~	Direct Use	Economic Rent	$461,337.00
	Non-Timber Forest Product*~	Direct Use	Economic Rent	$479,964.00
	Recreational@	Direct Use	Contingent Valuation	$259,018.00
	Ecological Functions	Indirect & Optional	Contingent Valuation	$323,106.00
Marine	Fishery~	Direct Use	Economic Rent	$21,761,047.00
	Recreational@	Direct Use	Contingent Valuation	$1,201,645.00
	Ecological Functions	Indirect & Optional	Contingent Valuation	$277,242.00
Total Forestry & Marine Resources:				$24,763,359.00

*may include values of resources collected from marine resources
@from international visitors only. Information on the number of domestic visitors is not available yet
~value varies when a sensitivity analysis of fair profit margin for business risk is conducted

9.3 Research and development

Flora

In terms of the research and development, there is still very little in-country attempt to investigate the social economic potentials of most of the native or more precisely of endemic plant species. Resources available are still committed to the cultivation and improvement of traditional and newly introduced food and export earning species. An example is the introduction of more than 200 species of fruit trees under the Fruit Tree Development project.

Only the Forestry Research Station at Vailima that implements the country's commitment to the South Pacific Regional Initiative on Forest Genetic Resources Project is directly involved with any research and development that relates to the potential of the endemic species of Samoa's flora. At this stage 31.2 hectare has been established in Savaii of a trial planting gene pool of selected high quality native and exotic timber species [RTFSS, 2000]. With the commencement of the project's second phase from last year, efforts are now underway to extend the establishment of trial planting to other government lands and customary lands of interested parties. Moreover, a local scientist has completed some formal training on the basics of maintaining old and establishing new gene pool trials [SPRIG 2, 2000].

The improvement of national legislations, policies and strategies for the protection and sustainable use of native flora hinges on the relevant components of the following three instruments: the currently proposed Environment Bill, the National Biodiversity Policy and the recently approved National Biodiversity Strategy and Action Plan [SBSAP, 2001]. Village ruling relevant to plant protection and other environment considerations seem to have relaxed. However, there is increasing local interests in native species for handicraft production and especially for traditional and modern medicines.

Vegetation

The value of the shrubs nonu a togi (*Morinda citrifolia*.) and fogamamala (*Homalanthus nutans)* to health and medicine were also realised, mainly through scientific research outside the country. Export of the nonu a togi became a popular commercial venture. An international agreement was signed between the Government of Samoa and a group of overseas scientists and developers for sharing of benefits that may accrue from the development of a potential cure for the deadly HIV virus from the fogamamala plant [SEF2001, 2001].

Several people were also interested to do research on the potential of other native species. A group of Japanese scientists working at the National University of Samoa expressed a keen interest in the native wild orchids of the country as seen by their recent collection of dead orchid specimens for scientific investigation in their home country [GOS, 2001].

A significant number of plant weeds were identified mainly in disturbed vegetation which pose a particular threat to the recovery of the native forests from major cyclones or other human disturbance. The following invasive species of plants require more action to contain their spread: fue lautetele (*Merrimia pelata*), fue saina (*Mikania micrantha*), vao migi (*Solanum sp.*), vao lima (*Paspalun conjugatum*), pasture grass (*Ishaemum timoriense*), tamaligi (*Albizia sp.*), siapatua (*Elaeocarpus sp.*), pulu vao (*Funtumia elastica*), and pulu mamoe (*Castilla elastica*). [SBSAP, 2001].

9.4. Institutional frameworks

Due to staff and office movements and the lack of hands-on training, the Environment Division was not able to maintain the biodiversity database. New attempts to remedy the situation and establish a more effective and enduring system started in 2001.

Several other important developments occurred during the decade which increased the appreciation of native plants species, especially in the field of medicine. Whistler in his book 'Samoan Herbal Medicine' discusses the uses of 81 plant species in Samoan medicine. Among these species 43% are native species, while the rest were introduced.

At the grassroots level, a non governmental organisation of traditional healers was formally formed and became an active participant in national and international developments related to plant life.

9.5. Challenges and issues

- Current logging concessions of the country's operating saw millers will only last for the next five years, unless they can adopt a standard of logging practice that will allow forest stands in their concession to regenerate, or they move to new forest areas [IFMUR, 2001] Table 16
- A new concern has arisen recently with the popular sale and unregulated operation of small portable mills throughout the country. Individual families mostly in the rural areas now privately operate around twenty such units.
- Very little is taking place with the watershed management programme. With the maintenance of vegetative planting at Vaisigano and Fuluasou catchments, there has been no significant activity to initiate programmes in the other major water catchments in the country.
- Commercial logging and agriculture expansion inland are still the main causes of the depletion and degradation of the remaining forest resources. Though some relief took place when agriculture development moved back closer to the coast at the height of taro blight in the middle of the decade, the successful cultivation of new strains of taro have lately again increase inland clearance for extensive taro planting throughout the country. Coupled with the new trend of privately operated portable mills, it is not difficult to imagine the extent of the complete depletion of this resource in its native state, in the near future.

Table 16: Remaining Available Indigenous Forest Areas of Saw millers Logging Concession at the end of 2001.

Sawmilling Company*	Remaining Available Area to Log** (Hectares)	Estimated Time to Log Remaining Area at Current Logging Rate*** (Years)
Bluebird	938	2
Strickland Brothers	341	2.5
Savaii Sawmillers	329	5
Samoa Forest / TVC	973	****

Source: Report for April to December 2001 Period of the Government of Samoa's Indigenous Forest Monitoring Unit, Forestry Division, Department of the Agriculture, Forests, Fisheries & Meteorology. *All sawmilling companies operate in Savaii. **Areas of merchantable forests concession under the sawmilling companies licenses. ***Rate of logging varies with the respective capacities of the sawmilling companies. ****Can not be adequately determined as this sawmilling company also operates outsides its license in other village of Savaii (Letui/Sasina which have had forest conservation programmes).

- Forest fires and the spread of invasive species are also compounding the threats against the ability of forests to regenerate. Severe fires had plagued large tracts of forests in Savaii along the west to northwest coasts during the prolonged dry season of 1998. Several invasive species have now spread rapidly in many deforested areas.

- Last but not the least of all, electric energy generation has become a significant development in the country's remaining wetlands and major water catchment areas.

9.6 The Way Forward

- The 1998 EIA regulations need to be formally approved by Cabinet.
- There is a need to strengthen the capacity of the regulatory agency (DLSE) to carry out adequate reviews of applications for sand extractions. There is also a need strengthen the monitoring and enforcement capabilities of the DLSE in relation to the provisions of the LSE Act 1989 dealing with the removal of sand resources from the coastal areas.

Fauna.

- Although baseline information exists on reptiles, they are poorly studied and thus much is still not known about their population distribution and current status. Thus it is envisaged that more studies need to be conducted to verify the gaps that exist in the current state of knowledge on Samoan reptiles.
- A management plan on invasive species (flora and fauna) is currently being drafted and a survey of invasive flora was recently completed during early February 2002.
- There needs to be a programme to specifically verify the existence of some of Samoa's birds species thought to be extinct, such as the native 'Punae' or Samoan Woodhen (*Pareudiastes pacificus*).
- Further work is needed to determine the current status of many other bird species. Accordingly, a monitoring programme should be undertaken to completely verify the status of species not adequately covered under previous studies.
- A full survey of freshwater and wetland ecosystems needs to be undertaken given that very little studies have been carried out on freshwater ecosystems.
- There is a need to carry out adequate studies on the use of freshwater resources and relevant traditional practices for the use and management of these species and ecosystems.

Forests

- The concern with saving the last fragments of the country's indigenous forests underscore the need to raise the level of commitment beyond current experience in the next 5 to 10 years, to support local communities forest conservation activities and the implementation of the national Government's present forest and watershed management policies. Time-bound actions and tangible results from the international and national agencies are urgently needed by village communities with forest conservation programmes to sustain their efforts, before they succumb again to the lure of short term benefits with long term disadvantages of the logging companies and as seen currently of privately operated portable mills.
- The current Government's forest programmes – watershed management, sustainable indigenous forest development and forest genetic resources development - should be accorded an appropriate level of support in terms of finances, human resources, training and education. With very limited available resources in the near future, it would be prudent for the Government to take action now on the proposal to have in place an integrated framework for the management of natural resources not only in terms of inter-agency cooperation but in organisational restructuring to ensure the optimum use of resources and a much more effective coordination of activities.
- As in the state of the native flora and vegetation in the country, there is still very little appreciation of the ecological values of indigenous forest resources and the potentials of its plant and animal life. Much more effort is needed to raise grassroot awareness of these values, and to inspire commitment to their promotion.
- Lastly, the Government in cooperation with village communities should seriously take steps within the next 3 to 5 years to curtail the local sawmilling companies operations

in new forest or conservation areas after they have logged their current concessions. A key issue in this respect is dealing with village authorities at assessing new development alternatives and making well-informed decisions.

Conservation strategies.

- Additional funding was recently approved for Samoa's biodiversity Enabling Activity. The 'Add-On' project as it is commonly referred to, will be implementing selected priorities identified during the NBSAP process (listed below).

    1. **Access to Genetic resources and benefit sharing** – Access to genetic resources and benefit sharing are relatively new issues that Samoa has been exposed to in light of new information being disseminated through the CBD secretariat, and other sources. This activity will involve the assessment of existing capacities, human and institutional, as well as existing policy measures. The results of this assessment will be used to formulate appropriate mechanisms for access and benefit sharing.

    2. **Preservation and maintenance of biodiversity related knowledge, practices, and practices** – The NBSAP recognises the significant role traditional knowledge, practices and innovations play in the conservation of biodiversity. Accordingly, activities will include the identification of key information on traditional knowledge, an assessment of capacity needs for relevant institutions concerning the preservation of traditional knowledge, and an assessment of plans and policies covering traditional knowledge.

    3. **Completion of the Clearing House Mechanism (CHM) for Samoa** – To ensure the effective and efficient flow of information both internally and externally of Samoa on the CBD and biodiversity issues of significance nationally and globally, Samoa needs to complete its CHM which was initially set up in 2001. Activities will include the establishment of a national environmental web site, development and dissemination of resource materials to increase national awareness of conservation and sustainable use, and a nation-wide dissemination programme for the dissemination of these resource materials.

- Species conservation programmes such as the 'Manumea Campaign' in 1992 need to be undertaken to promote the importance of protecting priority terrestrial species and to keep the public informed on the status of these species.
- There is a considerable degree of duplication reflected in the roles of various agencies involved in the conservation and management of biological diversity. These duplications of efforts need to be eliminated if any significant progress can be made. Legislative and policy provisions relevant to biodiversity issues need to be fine-tuned in order to address these constraints.
- Now that the NBSAP is completed, short and long term priorities for implementation need to be identified along with possible sources of funding. The NBSAP must remain a living document.
- Establishment of a comprehensive monitoring and evaluation programme to regularly assess the progress of actions and status of terrestrial biological resources.
- Future conservation programmes for terrestrial species must always utilise the participatory approach and aim to maintain cross-sectoral collaboration, for without these, programmes will fall short of their expected outcomes.
- The National Biological Diversity Policy 2001 should be prioritised for approval as soon as possible.
- Initiate and implement conservation programmes to recover and preserve endemic terrestrial species that are critically threatened and are on the verge of extinction.

- Assess the feasibility of Samoa becoming a party to other important biodiversity-related international conventions such as RAMSAR (Convention of the conservation of wetlands) and CITES (Convention on the Trade in Endangered Species), which can assist Samoa in managing its conservation systems.
- Mechanisms to curb species poaching and export, encroachment, and pollution within existing conservation areas need to be developed.

Flora

- In the short term, practical tools and responsibilities should be strengthened to properly coordinate the various ongoing activities which contribute either directly or indirectly to the protection and development of Samoa's flora. One such tool is the national biodiversity database of plants and animals. The database needs to be user friendly and an efficient information provider. With recent technologies, it is possible to expand its services to disseminate worldwide advancing knowledge on Samoa's flora, and through user pay arrangements, thus earning revenue to support its maintenance and future development.
- An effective system of regular monitoring and evaluation of the country's flora should be formulated and implemented as soon as possible as it is almost a decade since the initial identification and comprehensive study of key sites for flora, fauna and ecosystem conservation was carried out.
- An effective and strong networking of focal points of organisations and individuals that are involved with plant species development and protection should be established. The formation of a local traditional healers organisation and the start of interdepartmental actions to control and eradicate invasive species is an example of potential efforts to achieve this.
- With increasing interest from scientists and developers of countries with advanced technologies on the country's native flora, its important first, to establish in earnest an effective procedure to monitor and manage the transfer of plant specimens for research and development outside of the country while legislations are being formulated, and research and development capabilities are being developed. An important consideration in such a procedure is the terms of agreement for the sharing of benefits, which may arise from the discovery, and utilisation of native species. Similar effort should be made to effectively monitor and manage the importation of new plant species into the country[SBSAP, 2001] Stronger commitment to stop the illegal entry and cultivation of exotic plant species should be strengthened, especially in the work of the state agencies – quarantine and customs – with direct responsibilities in this area.
- Since most of the action take place in the villages, efforts should be focussed on increasing the grassroots participation in the conservation of native flora, so that by the turn of the current decade a significant number of village communities will have some areas of their forests resources set aside for the protection of native flora. Incentives, training and practical demonstrations should continue especially in the development of income generating activities to mobilise the local communities resources and abilities.

  At the national level the government and non governmental organisations should finalise the relevant policies and enact necessary legislations that will improve the management and development of native flora, especially the protection and development of endemic species. In the long run, education and training needs to take place to increase the appreciation and enforcement of these policies and regulations by the grassroots communities.

Vegetation

- The most obvious priority in the next decade is to assist the management and development of already established state and village owned conservation and

protected areas. Management plans should be improved or effectively implemented in the Government's national park and reserves and as well as in different village conservation areas.

- More support should be provided for the proper development of income generating activities in the village communities. New issues and considerations for these village programmes can only be properly incorporated if current activities there are maintained at a reasonable level of effective management. Relevant education and hands on training should be increased and be more localised to suit the needs of village communities.
- At the same time efforts should start in the coming years to approach the other key lowland and upland sites that were identified for priority conservation and protection. In line with this is the need to raise the understanding of local communities on the value of vegetation and ecosystems in these sites.
- In terms of information development and use, the currently re-developed biodiversity database should be expanded to also include data on parks, reserves, and community conservation areas. More hands information on national parks such interpretative labels and proper tour guiding should be provided to improve the experience gained by tourists and the public who either visit or camp in these areas.

CHAPTER 10: ENERGY RESOURCES

10.1. Context

The energy sector is one the fastest growing sector of the economy. Between 1989 and 1998, the primary energy supply, including biomass, grew at an overall average annual rate of 2.9 percent. However, because of the slow growth in the utilisation of biomass, the overall rate masks the growth of the commercial energy market. After remaining fairly flat through the middle of the decade because of an extended economic downturn and the commissioning of the Afulilo Hydroelectric Project in 1993, petroleum imports have increased at an average annual rate of about 30 percent in the two years since 1996.

The 1990s saw the commercial primary energy supply (including hydroelectricity) and petroleum consumption both growing at an average annual of about 5.7 percent, while net final energy demand increased at a rate of 5.4 percent. The fastest growing components of the primary energy supply were, as mentioned, hydroelectricity (6.6

percent), petrol (9.2 percent), and ADO (6.9 percent). Petroleum consumption was approximately 43.1 million litres in 1989, increasing to about 71.2 million litres in 1998.

The commercial energy sector in Samoa has expanded rapidly over the past ten years. Key components of energy, especially electric power, have shown strong growth each year despite the lengthy period of economic downturn that followed the two cyclones in 1990 and 1991. The previously dominant traditional energy supply (the non-cash economy supply of woodfuel and coconut residues still used by households and agro-industries) now accounts for less than half of Samoa's primary energy supply. Growth in all forms of commercial energy demand is expected to continue through the next ten years, with highest growth in electricity followed by transport fuels. Of importance in regard to future fuel import volumes, is the fact that growth in electricity requirements will have to be met largely by increments to diesel generation.

Based on continued growth in transport demand, and a high growth in electricity consumption, the commercial primary energy supply and net final demand are expected to grow at about 3.7 percent per annum in the next five years, while petroleum consumption increases at 3.5 percent. Petrol and ADO for transport are expected to grow at 2.7 percent and 2.9 percent per annum respectively, while ADO for power generation grows at 7.7 percent. Growth in consumption of other petroleum products is likely to be low. Petroleum consumption overall is expected to reach about 100 million litres per annum in 2008.

10.2 . Institutional frameworks

Rapid growth in the commercial energy market brings with it increasingly urgent requirements for prudent management of the sector. In the past year, the government has taken substantial steps to come to grips with weaknesses in both segments of the commercial energy market, electric power generation and petroleum imports and has set in place the following:

- A comprehensive power development plan has been adopted (1997)
- A tariff review has been carried out (April 1998)
- A substantial tariff increase was implemented (September 1998).

Though important issues remain to be resolved-the power sector may yet undergo substantial restructuring-these measures have greatly increased confidence that the Electric Power Corporation will meet demand requirements in the years ahead.

In petroleum, the government has negotiated and implemented:

- A new supply agreement in May 1998 with a single international oil company in place of two companies previously, which has rationalised supply conditions and resulted in a significant reduction in product prices.
- A key component of the new supply arrangement is government's undertaking to construct new oil storage facilities. These storage facilities in Sogi, Faleolo, Asau and the Matautu wharf have been completed. For the first time, government will own the majority of oil storage capacity in Samoa, which in turn improves its bargaining position with international suppliers.

10.3. Challenges and issues

- Largely, the EPC Board of Directors has undertaken the power sector reforms, while the petroleum supply arrangement have been the responsibility of Treasury. In the energy sector as a whole, there is a need to formalise the gains that have been made

and to assign responsibilities throughout government for managing its myriad of central and ancillary aspects.

- These include, *inter alia:* proper energy facilities operation and management, adoption and enforcement of performance and environmental standards backed by appropriate legislation, promotion of prudent demand-side management, provision for effective monitoring of government-owned energy supply companies and facilities, and promotion of economically-viable renewable energy development. These priorities require an unprecedented degree of interdepartmental co-operation in joint management of the energy sector. It is proposed that Treasury take a primary co-ordinating role in the process.
- The development of the energy policy is central to this whole exercise. The policy should be supported by an institutional structure with strengthened involvement of other departments that are necessary for its effective implementation.

Chapter 11: NATIONAL INSTITUTIONS AND ADMINISTRATIVE CAPACITIES

11.0 Context

Growing concerns by both the Government and public about protecting the fragile local environment and increased awareness of the need to conserve the use of natural resources have become more evident in recent years. The threat of environmental degradation within the constraints of finite resources most of which are non-renewable,

has led to the realisation that a sustainable future "requires an effective approach to resource management". This new trend in thinking is in stark contrast to the indifference and lack of appreciation accorded environmental issues over the past years.

The establishment in 1989 of the Division of Environment and Conservation (DEC) within the Department of Lands, Survey and Environment (DLSE) signalled the first tangible evidence of the importance government was placing on environmental issues. DEC's primary role is to influence the management of natural and physical resources and ecosystems, enact effective environment legislation, ensure and promote the conservation and protection of the natural resources and environment, in addition to acting as the advocate of environmental conservation. (DLSE Act 1989,52)

The establishment of DEC was based on government's conviction that sustainable development will only occur through institutionalised environmental planning and management supported by appropriate legislation. Government, according priority to environmental issues within the overall national development process implemented this initially. This was partly achieved in 1992 when environmental issues and concerns featured in the long-term development planning tool (Seventh Development Plan).

In 1993, the government developed its National Environment Management Strategies (NEMS), which sets out the procedures and structure for environmental management and sustainable development, and outlines activities to guide effective environmental management in a bid to conserve the country's limited resources. This was yet another conscious attempt to strengthen the integration of development and environmental issues.

Though the existence of NEMS was a positive step in the right direction, the latter still needs to be given greater credibility through adequate resources and integration into the government's planning process.

Since 1996, the long-term development plans were replaced by the biannual Statement of Economic Strategy (SES), which defined the national policy framework and the strategic directions and development priorities of government towards a sustained quality of life for the Samoan people. Significant progress has been achieved since 1996 with each SES reviewing and improving on previous development milestones.

In the SES 2000-2001, Government pledged to ensure that all contribute positively to the partnership between Government and the private sector for long term sustained benefit with priority given to sustainable management and development of the environment in areas of environmental planning and policy, climate change, oceanic/coastal resources, waste management, biodiversity and capacity building.

In the years leading up to and following UNCED, several important international and regional environmental conventions, agreements and other legal instruments have been negotiated and concluded. The Government of Samoa, since UNCED, has shown its interest and commitment by adopting various international and regional environmental related instruments listed below.

A. Multilateral Environment Agreements & Legislation

11.1. National actions and achievements:

11.1.1 International agreements:

- Ratified the United Nations Framework on the Convention on Climate Change on 29 December 1994
- Ratified the Convention on Biological Diversity on 10 February 1994
- Ratified the Convention for the protection of the Ozone Layer on 21 December 1992
- Ratified the Montreal Protocol on Substances that deplete the Ozone layer on 21 December 1992
- Ratified the United Nations Convention on the Law of the Sea, 1982 on 14 August 1995
- Ratified the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, on 23 October 1996.
- Acceded to the United Nations Convention to Combat Desertification on 21 August 1998
- Ratified the Cartagena Protocol on Biosafety, on 13 March 2002
- Ratified the Kyoto Protocol to the Framework Convention on 15 November 2000
- Ratified the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean on 02 January 2001
- Ratified the Stockholm Convention on Persistent Organic Pollutants on 4 February 2002.
- Acceded to the Convention concerning the Protection of the World Cultural and Natural Heritage, on 27 August 2001
- Acceded to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal on 22 March 2002
- On February 7 2002, Samoa deposited with the International Maritime Organisation in London, its Instrument of Accession to the International Convention for the Protection of Pollution from Ships 1973 and its Protocol, 1978**.**
- Likewise Samoa has also deposited with IMO its Instrument of Accession to the following Protocols . 1992 Protocol of the International Convention on Civil Liability for Oil Pollution Damage, 1969 and the 1992 Protocol to the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 on 1 February 2002. Advice received by the Government of Samoa from the IMO Secretariat is that Samoa need not accede to the Conventions proper but only to the protocols as they regulate the current international regime on the protection of the marine environment from marine pollution.

11.1.2 Regional Environmental Agreements & Instruments

- Ratified the Convention on the Conservation of Nature in the South Pacific, on the 20 July 1990
- Ratified the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region, on 23 July 1990
- Acceded to the Convention for the Prohibition of Driftnet Fishing in the South Pacific on 09 September 1996
- The Government passed an Act that bans the practice of Driftnet fishing in all waters which Samoa claims jurisdiction over; Fisheries (Ban of Driftnet Fishing) Act 1999 as well as the Maritime Zones Act 1999
- Ratified the Convention to Ban the importation into Forum Island Countries of Hazardous and Radioactive Wastes and to control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region (Waigani Convention) : (*bans importation of hazardous and radioactive wastes generated outside the region in Forum Island Countries and controls the movement of such wastes within the region) on* 16 May 2001

11.1.3 Implementation of conventions and agreements

- On the Climate Change Convention, Samoa is committed to the objectives of the UNFCCC and Kyoto Protocol. Samoa accepted its UNFCCC commitments and has moved to implement its obligations, which include the submission in 1999 of its National Communication to the UNFCCC Secretariat. A Green house Gas Inventory and the Vulnerability & Adaptation Assessment formed the major part of the National Communication, with projections and recommendations in the Communication arising out of the outcomes of these specific studies which include developing suitable and practical mitigation and adaptation strategies. (Samoa's National Communication, 1999, vi).
- The Pacific Islands Framework for Action on Climate Change developed with the assistance of SPREP was endorsed in 2000 in Guam by Pacific Ministers of Environment
- In 1998 Samoa submitted its first National Report to the Secretariat of the Convention on Biological Diversity. This same Report, carried out through collaborative multi-sectoral consultation, was updated in December 2000 and translated into the Samoan language.
- Samoa's National Biodiversity Strategy and Action Plan formulated in 2001, was the culmination of extensive research and multi sectoral consultative activities. The strategy outlines the state of Samoa's biological resources and identifies actions to curb their degradation and achieve sustainable development. Furthermore, it is the Government of Samoa's expressed commitment to the Convention on Biological Diversity. (NBSAP, 2001, 5)

11.1.4 Legislative framework

Government recognises that current national laws are inadequate in providing comprehensive protection for the environment. Previous legislations were more focused on resource exploitation with little to no value placed on the protection of the environment. Much of the old legislation is scattered in various Acts administered by different ministries and departments.. The *Lands Surveys and Environment Act 1989*, although it encompassed the protection of various natural resources was merely an institutional framework leaving the substantive content to be handled through regulation,. The "environment" however is defined as 'the physical features of the surrounding of human beings, including the land, water, atmosphere, climate, sound, odours, tastes, the biological features of animals and plants and the social features of aesthetics. There is no reference to the social, cultural and economic context in which land and other resources are inevitably utilized, other than the very limited reference to "the social features of aesthetics".

Sustainable development, which requires the integration of environmental factors with socio economic considerations in decision-making processes, is not referred to at all.

Part VIII of the LSE Act deals with the "environment and conservation" and focuses on natural resources and the environment- its application extending to the territorial waters of Samoa pursuant to *The Lands and Environment Part VIII Application Order 1992/3 No.2*.

The principal functions of the Department in relation to the environment and conservation are described very broadly under this Part and includes the provision of advice on "all aspects of environmental management and conservation" ensuring and promoting "the conservation and protection of natural resources and the environment". It also includes the provision of advice to the Minster on national parks and reserves, dealing with pollution, carrying out research and promoting public awareness of the environment and conservation. Other specific issues on which the Department must provide advice

include “ensuring the effective provision is made for public participation in environmental planning…. processes”, and the potential environmental impact of development proposals, both public and private.

Procedures were often complicated leading to revision (without actually changing the law) usually for practical reasons, i.e. shortage of administration staff, general ignorance of the law – the net effect of this was that the law was ignored at times.

An Environment Board is also established under this Part with its principal objective being “the protection and conservation of the natural resources and the environment. Its membership is broad based and includes representatives from government departments-(namely Agriculture, Education, Forests and Fisheries, Health, Trade and Commerce, Transport), as well as industry and community representatives and a representative from the Pulenu’u Committee, with the DLSE Director as advisor and secretary to the Board. The Board is currently non-functional.

It has however been recognized that in order to achieve the aims of sustainable development and environmental protection (bringing Samoa in line with global trends), adjustments need to be made to existing legislation. The Environmental Legislative Review, which took place in 1993, with its specific recommendations on various aspects of existing legislations, could be a good starting point. For instance, agreement must be reached on the extent of change(s) needed to existing arrangements.

The following Bills are in the various stages of the legislative approval process of government;

- ***Environment Bill 199x***
  (To protect, conserve and enhance the quality of the environment of Samoa having regard to the need to achieve sustainable development, to establish and effective administrative structure and to make provision for the development, administration and enforcement of effective legislation for environmental matters) This Bill is yet to be submitted to Cabinet for endorsement before tabling in Parliament.
- ***Environmental Bio-Prospecting Regulation1999***
  (To regulate access to Samoa’s genetic resources and the equitable sharing of benefits derived from its users)
- ***Ozone Layer Protection Bill 2001***
  (To provide for the protection of human health and environment against adverse effect resulting or likely to result from human activities which modify or are likely to modify the ozone layer and to implement in Samoa the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that deplete the Ozone Layer)
- ***Beverage Container Deposit Scheme Bill 1999***
  (To provide for the payment for and refund of deposits in respect of beverage containers to encourage recycling and to protect the environment)
- ***Environmental Impact Assessment Regulations 1998***

B. Government policies

11.2.0 Context

In 1993 the Government of Samoa launched its National Environment Management Strategies. The significance of NEMS is that it identified 12 target environmental components (TEC’s), which directly aimed at responding to pressing environmental problems that might have an impact on the local environment in the future and took a

holistic approach in creating cooperation between government agencies to work together towards managing the 12 priority environment issues. In order to effectively respond to the 12 TEC's identified, political commitment was necessary through the development of policies for each of the 12 priority environment issues and to create a proper climate for sustainable development. These include the;

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

Prior to the development of NEMS in 1993 there were already obvious indicators of the government's support for the protection and conservation of Samoa's local environment seen in the enactment of the *Lands, Surveys and Environment Act 1989*, which set up the current Division of Environment and Conservation.

Samoa's involvement in the UNCED 1992 saw the commitment and support of GOS in responding to environmental concern at both global and local level. Prior to the Earth Summit 1992, national initiatives had already taken place in- country. This includes; the establishment of the Division of Environment and Conservation 1989, within the Department of Lands, Surveys and Environment, the Lands, Surveys and Environment Act 1989, to include provisions for the protection and conservation of Samoa's environment. As well, the release of the Seventh Development Plan 1992, showed great emphasis on environmental protection and sustainable development. The NEMS document provided a national framework for Samoa to adopt sustainable approaches in addressing 12 target environmental components which poses pressing threats to the local environment. The environmental issues outline in NEMS was Samoa's challenge to face from 1993 to the present.

Samoa throughout the past decade has endeavoured to implement policies and strategies as legal instruments in guiding national developments. The government's attitude towards environmental concern presents a positive support through the endorsement of four NEMS policies last year. All these policies had a common interest of promoting sustainable development with regards to any type of development that takes place in Samoa, and most importantly minimize any adverse impact on the natural, social and cultural environment.

11.2.1 National actions and achievements

- **Four NEMS policies were passed by government in July 2001**. These are;

  - National Waste Management Policy (NWMP)

  The NWMP presents national guidelines for the minimization, control and management of wastes and pollution. This is vital for the sustainable social, environmental and economic development of Samoa. It aims at reducing, controlling and managing wastes and associated pollution in a sustainable manner in order to protect, maintain and improve the quality of life in Samoa..

- National Landuse Policy (NLP)

The NLP focus more on promotion of sustainable utilisation of Samoa's land resources so they can best meet the needs of both present and future generations.

- National Water Resource Policy (NWRP)

The NWRP provides the framework for the conservation, sustainable use and management of Samoa's water resources. The goal of NWRP is to ensure community access to water of suitable quality and appropriate quantities are meet at all reasonable health, environmental and economic development needs

- National Policy on Population and Sustainable Development (NPPSD).

The NPPSD on the other hand, prioritise the integration of population issues into development planning and assessment so that to ensure that the effects of population changes on the environment are well understood and any adverse impacts is addressed during programme planning and implementation.

The four NEMS policies that have been approved by government are now working documents for the implementation of any environment programmes related to issues on landuse, population, waste and water. These four policies have strategies, which are to be implemented accordingly with programmes highlighted in the Statement of Economic Strategy 2000, pertaining to environment related issues

- Five other NEMS policies are in draft form and ready to be submitted to cabinet for approval. These include Planning for Climate Change Policy, National Policy on the Conservation of Biological Diversity, National Forest Policy, Protection of the Atmosphere Policy and the Cultural and Natural Heritage Conservation Policy.

- **The Government approved the DLSE Institutional Reform Policy (IRP) in 2000.** The approved IRP long-term objective is for DLSE to become an efficient and effective organization that is well placed to manage and address Samoa's lands and environmental needs and supports greater involvement of the private sector in its activities as part of promoting partnership with the government as stated in the SES 2000
- **Approval of the Coastal Infrastructure Management Strategy (CIMS)2001** The CIM strategy sets the scene for promoting better management of coastal infrastructure at a national, district and local level to develop greater hazard resilience for the Samoan community. CIMS is part of the government's national level policy planning and management. This policy sits alongside strategies identified in the NEMS (1993) and SES (2000) to establish an overall structure for the sustainable management of natural and physical resources and the environment. The main vision of CIMS looks at coastal infrastructure and communities resilient to natural hazards.
- **Establishment of the Samoa Water Authority in 1994** in order to address the need for improved quality, efficient services and allocation of water resources of the country. This is seen in the SWA mission statement to form a partnership with its customers, the people of Samoa in an effort to provide reliable, safe economical water and sewer services in a manner that is efficient, fair, progressive and environmentally and socially responsible.
- **Adoption of the draft EIA legislation** and implementation. There is widespread awareness of, and support for, the concept of EIA among the line departments and agencies of the Samoan Government. The draft EIA Regulations (1998) set out the

basic process for impact assessment in Samoa for both private and public development proposals.The draft regulation only allows DLSE, to issue guidelines indicating which development proposals, or types of environmental impact, are permitted without further consideration under the regulations.

C. Institutional Arrangements

11.3.0 Context

There have been major changes undertaken by government through its public sector reform programme and the strengthening of partnership with the private sector in terms of outsourcing some government activities to be implemented by private operators.

Although DLSE is the focal department spearheading all related activities of environmental concern, there is growing involvement of other government departments, non-governmental organisations (NGO's) and the private sector to address environmental issues. The establishment of the National Beautification Committee 1997 (NBC), within the Samoa Visitors Bureau is one indicator of inter-departmental networking with the private sector in monitoring and regulating a clean environment in work places and village areas. The NBC conducts regular visits to business areas and villages for clean-up purposes and beautification of villages encouraging more community participation to develop clean environment.

NGO's with an environment focus continue to be involved in the implementation of government-led environment activities. Their role lies in advocacy for environmental management in areas of education and public awareness and highlighting local environmental issues. The roles and functions of environment *NGO's* are not clear-cut. Some have been delegated the implementation of projects at community level while others are involved in the review of activities undertaken by the Department of Lands Surveys and Environment. There are currently three existing environment NGO's; O Le Siosiomaga Society Inc, Faasao Savaii and METI (Matuaileoo) Environment Trust Inc.

The first DLSE Corporate Plan addresses the next three operational years of the department, aiming at achieving sustainable management of Samoa's environmental resources through a closer partnership with the private sector. The Corporate Plan 2000-2002 outlines the newly approved structure for the department which became effective in 1999 (Annex:1), with the addition of a new division (Land Management) and the expansion of other sections within some divisions of DLSE. The Corporate Plan sets out strategies to achieve its stated objectives for the next three years in line with its stated vision and mission, the latter being " to further develop and implement best practises in the sustainable development of the country's environmental resources, in partnership with all relevant stakeholders" (DLSE: 2000).

DLSE attempts to focus more on a holistic approach for the sustainable management of Samoa's environmental resources. The Division of Environment and Conservation has been expanded with new positions and the splitting of the Biodiversity Section into Resource Conservation Section and the National Parks section to further distinguished separate activities executed by each section.

DEC houses all environment projects with designated project officers to coordinate these programmes at the national level and provide correspondence to international counter-parts on the progress of implementation of activities. Hence, these projects include Climate Change, Montreal Protocol, International Waters, Persistent Organic Pollutants and IUCN Marine Protected Area project.

11.3.1 National actions and achievements

- Completion of the institutional strengthening review project for DLSE. The Institutional Strengthening Review for DLSE conducted under the World Bank Infrastructure Asset Management Project (IAMP: 2001) for the implementation of Coastal Environmental and Institutional Services (CEIS) suggest overwhelming changes for DLSE. The CEIS project is expected to provide assistance for DLSE with sustainable institutional development and capacity building toward its longer term mandate as steward of environmental management, focusing on policy, regulatory, supervisory and advocacy functions. DLSE has a new structure with changes incorporated (Annex:2. DLSE Structure, 2000). For instance the addition of the Land Management Division and expansion of DEC to four sections together with the employment of project officers, all indicate the vital role that environment concerns have with regards to responding to all major environmental issues.
- Completion of the Capacity Building in Urban Planning and Management Technical Assistance project funded by the Government of Samoa and ADB which focused on capacity building and strengthening the skill base of counterparts and village community groups in the preparation of an urban management and planning system with its procedural regulatory and legislative options and implications.
- Completion of the National Biodiversity Strategy Action Plan (NBSAP) 2001 with funding from the Global Environment Facility (GEF) Enabling Activities as an initial step to meeting obligations and addressing issues covered in the Convention on Biological Diversity adopted at the 1992 UNCED.

D. Specific Projects and Programmes

11.4.0. Context

Ten specific environment programme's were proposed in 1992 as major areas of concern that the relevant government agencies especially the newly established DEC were to work on in order to address ways of sustainably managing Samoa's local environment. New Programmes have come about as a result of Samoa being a signatory to various environmental agreements, both international and regional.
The current situation saw the expansion of DEC with employment of specific project officer's to undertake tasks that directly relate to programmes such as Climate Change, Montreal Protocol, International Waters and Persistent Organic Pollutants. These programmes relate more to global environmental issues, which can have great impact on the local environment

The IUCN (International Union for the Conservation of Nature) World Bank Project in partnership with the Government of Samoa for the Marine Protected Area project carried out in the two districts of Safata and Aleipata responds to guidance from the Conference of Parties (COP) on the conservation and sustainable use of marine and coastal biological diversity; capacity development and human resource development; institutional strengthening; indigenous communities; innovative measures; and Government – private partnerships for management.

11.4.1. National actions and achievements

- Prior to UNCED, a number of projects had begun. These included the UNDP funded Watershed Management project which highlighted public awareness of the benefits of integrated watershed management. Its outcomes contributed to the endorsement of legislation to set up the Samoa Water Authority separate from the Public Works

Department. A number of conservation agreements signed between some villages and private donors in order to protect their indigenous forest as conservation sites, while donor organizations assisted with some village developments such as Falealupo and Tafua village in Savaii. From 1988 to 1992 two ecosystem surveys were conducted; the first one was carried out with support from SPREP and The Nature Conservancy (TNC) which, systematically collected information for the conservation of biodiversity while the New Zealand Government and the World Wide Fund for Nature funded the second survey of the lowland ecological ecosystems and this covered marine resources. Another UNDP funded project supported an inshore assessment of marine resources. Initial preparations of the draft EIA legislation and pollution controls regulations took place.

- Adoption of the National Environment Strategy in 1993. The main focus of NEMS was on a cross-sectoral policy development targeting the 12 priority environment issues or target environment components
- A number of protected area systems were established in the post UNCED period. Six new nature reserves and botanical garden in addition to the existing four were established, 4 watershed management areas were identified and 2 major community conservation areas fully managed by the village communities were declared. About 59 community-owned and managed fish reserves have been established on Upolu (38), Savai'i (17) and Manono (4) (Environment Forum, 2000) under an AusAID funded Fisheries Extension project to address the problem of fast depleting inshore marine resources. The success of this programme has lead to some villages in setting up by-laws under this system of protection to provide the legal mandate for management their fishery resources effectively.
- Samoa Marine Biodiversity Protection and Management project (1999-2004)**.** DLSE in partnership with the IUCN (World Conservation Union) is working with the Districts of Safata (9 villages) and Aleipata (11 villages) to establish two multi-use, community-based marine protected areas which objectives are to empower the local communities of these districts to effectively protect and manage coastal marine biodiversity and help them achieve sustainable use of their marine resources.
- Species Protection Programme: The South Pacific Regional Initiative on Forest Genetics projects initiated in 1996 with its overall objective to better conserve and sustainably develop the region's forest genetic resources. This project is currently coordinated by the Forestry Division and the project arose out of concern for the rapid rate at which forest genetic resources are depleting due to direct result of logging and agricultural activities.
- The Pacific-German Sustainable Indigenous Forest Project has established a pilot site at Samalaeulu Lowland Forest in Savaii. The aim is to develop community-base sustainable systems for harvesting and maintaining forest resources viability in Samoa. Established in 1998, the project is awaiting the settlement of land disputes between members of the Samalaeulu village council before it undertakes the first trial harvesting of forest resources at the pilot site.
- A New Zealand funded National Inventory of Terrestrial Resources project was completed in 1994 through an ecological survey of mid-slope and upland forests with a view to identifying key sites of significant size, so that their subsequent conservation would cover the full range of habitats to ensure the long term survival of species and genetic biodiversity. There were three grading for the sites being surveyed; grade-1 referred to the most important sites of significant size with links to lowland forests such as Gagaifomauga III and Palauli West, and Anoamaa. Grade-2 site was ranked important because of the opportunities available for immediate action and the uniqueness of its biodiversity and covered all of Eastern Upolu Uplands and the rest of other areas were grade-3 sites. The survey also recommended for its findings the need to undertake wetland survey, and carry out more detailed entomological studies (GOS: 1998).

- Strategic Action Programme for International Waters 2000-2005 which focus is on fresh water resources is currently underway with the employment of the national coordinator to work within DEC .. The identification of fresh water as the main focus for Samoa emerged as a priority component given the number of development projects and major competing users of fresh water resources; such as the Samoa Water Authority for piped supplies, the Electric Power Corporation for hydropower. As well the continuous logging of indigenous forests and agricultural development will have a perilous impact on the environment, with loss of biodiversity, land degradation and over exploitation of fresh water resources. The prioritising of fresh-water in this project poses a need to regulate the extraction of underground water, as increase consumption and excessive use of natural resources may deplete this valuable resource.
- Solid Waste Management Programme. DLSE through on-going project continues to address the issue of waste management by focusing on activities such as; waste separation, waste assessment and evaluation, public awareness campaigns with a specific national day on Waste Awareness in Samoa and development of strategic and planning policies in order to minimize the generation of any type of waste. As well the SPREP funded Solid Waste Awareness and Waste Minimisation project focuses on public education through stakeholder consultations, community and school workshops.
- Other relevant programmes currently operated by DLSE includes; the contracted municipal waste collection in Apia which started 1994; the rural waste collection for the rest of Upolu and Savaii and this started early 2001; the development of the Vaiaata landfill 1999 and its daily operation in Savaii; development of a sanitary engineered landfill at Tafaigata, and its daily operation.
- Persistent Organic Pollutants programme: The objective of this programme is to create sustainable capacity and ownership in Samoa to meet obligations under the Stockholm Convention, including initial preparation of a POP's Implementation Plan, and broader issues of chemical safety and management as articulated in Chapter-19 of Agenda 21. Samoa does not produce any of the substances listed as controlled Persistent Organic Pollutants in the Convention however it relies on imports to supply all of its agricultural, medical, and industrial chemicals. (POP's Project Proposal: 2001).
- The Climate Change programme started in 1997- 2001 under the PICCAP (Pacific Island Change Assistance Programme) project and Samoa is one of the participating Pacific Islands. The government has submitted its first National Communication Report to the Conference of the Parties (COP) in 1999. Samoa's national communication report covers both issues of climate change and sea level rise in the country as well as action plans to address them. The National Implementation Strategies is currently underway, a draft national policy on Planning for Climate Change is under cabinet consideration for approval and an extensive public awareness campaign has begun.
- Montreal Protocol Country Programme: Protection of the Ozone Layer. Samoa, is among the first island states of the Pacific to have established a National Ozone Unit in 1999 as part of its Institutional Strengthening Project, funded by the Multilateral Fund. Samoa has completed its national phase-out strategy, which runs parallel with the Country Programme and Refrigerant Management Plan 2000. At the national level, awareness programmes through media publicity, presentations in schools and communities, and considerable activities take place during September the month of World Ozone Day every year. . A draft national policy on the Protection of the Atmospheres pertaining to programmes on ozone depleting substances is almost completed. The action plan adopted an accelerated timetable of ODS phase-out by the 31 December 2001. Key aspects of the Action Plan are legislative bans, and restriction on imported ODS as well as on ODS-based equipment and products.

11.5 Challenges and issues

- The need for capacity building including the strengthening of national institutions and Climate Change Country Teams are well recognised.
- Analysis has revealed however that there is a need to adjust existing legislation given the inadequacy of the coverage provided (NBSAP, 2001, 83). Obviously, the Government of Samoa will need to ensure that appropriate measures are in place to fully address relevant and critical biodiversity and conservation issues
- Samoa is aware of the urgent need for changes or adjustments in the existing legislation concerning the protection and conservation of the environment
- There is a need for better coordination of all key stakeholders involved in the environment sector
- The current implementation of CIMS very much highlighted in this report the need for DLSE to prepare a sustainable development and management framework that will include the CIM Strategy but also at the same time integrate other non-coastal aspects of sustainable management.
- There is a need for capacity building for DLSE towards a longer term mandate as a steward of environmental management, focusing directly on policy formulation, regulatory, supervisory and advocacy functions

11.6 Coordination and decision-making

In addition to DLSE, the Department of Agriculture, Forests, Fisheries and Meteorology (MAFFM) also plays a role in the conservation, protection and development of natural resources particularly soil, water and forest- under *the Forests Act 1967*. Amongst other Acts administered by MAFFM is the *Fisheries Act 1988*, which focuses in controlling foreign fishing in Samoan waters in its attempt to conserve, manage and develop fisheries in Samoa. Unfortunately the Act does not extend to include the conservation of any other marine resources. *The National Parks and Reserves Act 1974* provides for the establishment, preservation and administration of national parks. *The Exclusive Economic Zone Act 1977* sets out the economic zone and allows the provision of regulations for the protection and preservation of the marine environment of the zone.

The Department of Public Works is responsible for the administration of water resources (rivers, springs, streams and lakes), its conservation supply and use under *The Water Act 1965*.

Currently ongoing is a review of existing Samoan legislation relating directly to ***land use planning***- capacity building for urban planning and management in Samoa. This review is not restricted to environmental legislation but covers all legislation having a bearing on the use of the land. It attempts to identify both opportunities and gaps in the existing legislation for the purpose of identifying possible innovative approaches for Samoa, particularly in relation to land use planning strategies sensitive to customary land holdings.

Customary Law, has to some extent been integrated with environmental law, taking into account the sensitive nature of issues pertaining to natural resources, particularly land. Customary land is unable to be alienated without the consent of the Minister (who then acts as trustee for the beneficial owners of the land), and environmental issues have in recent times been part of the determining factors as to whether applications for alienation of customary land are granted. This is also the position taken by the Land Board in regards to Government Lands.

Samoa does not have an ***Environment Impact Assessment*** legislation requiring EIAs as a prerequisite for development proposals. However a draft EIA Regulation has been developed, but again is yet to be endorsed. The Government has however endorsed the use of EIAs for all major projects although quite often developments continue to proceed without environmental assessments being done, or done after implementation.

Increased consciousness about the importance of the environment has prompted the Government of Samoa to recognise the need to translate sustainable development policies and such international accords and conventions into action through country-specific national legislative and institutional measures.

The Division of the Environment and Conservation (DEC) has drawn up, during the process of putting together DLSE's Corporate Plan 2000-2002 a draft framework for the ratification and implementation of Multilateral Environmental Agreements, Samoa is a Contracting Party to. The draft framework will be a useful tool for coordinating existing and future ratifications.(DLSE RIS- Draft Discussion Doc, 2001). For the immediate future, Samoa must continue to actively participate at the regional and international levels in negotiations on climate change and biodiversity related issues to ensure that Samoa's needs and priorities are taken into account and that it continues to stay abreast with developments in these crucial areas. .

Through its multi-sectoral National Climate Change Country Team, Samoa has successfully involved all the relevant Government Departments and key stakeholders in coordinating and contributing to sector policy development and national activities. Samoa continues to welcome assistance from the international community, and the opportunity to work collaboratively to raise awareness about the vulnerabilities to climate change and sea level rise and to identify suitable adaptation options, and to promote cost –effective, feasible and culturally acceptable adaptation and mitigation measures (Samoa's National Communication, 1999, ix).

11.7 Capacity building

The recent focus by the Samoan Government on the environment leading to the desire for increased Environmental legislation is partly attributed to increased public awareness and knowledge of issues as a result of environmental education and awareness programs. Hence public participation has been widely sought in the more recent developments in environmental legislation. The following are a number of examples of awareness programs that occur annually:

- Environment Week
- Ozone Day
- Waste Management Day
- Climate Change Day

Another contributing factor is the increased training of the authorities/ professionals charged with the implementation and enforcement of the relevant environmental legislations. The desire and commitment to protect the environment has seen a conscious attempt by other line ministries to consult with environmental *agencies* more frequently on important environmental issues. This consultative approach differs greatly from the commonly ill-informed or ill-advised arbitrary decisions made in the past, with little or no regard of the environment.

A Legal Division of the DLSE has been established consisting of a Principal Legal Officer, with the decision on an additional Legal officer still pending. The establishment of

this division demonstrates the Department's willingness to ensure understanding and compliance with current legislation and the need for on-going review

11.8. The Way forward

Legislation

- Samoa is aware of the urgent need for changes or adjustments in the existing legislation concerning the protection and conservation of the environment - the development of the required regulations to make the Act an effective planning tool, being a good starting point. Regulations should be made to allow Samoa to fulfil its obligations as required under International Conventions Samoa is a party to.
- A significant limitation in the current LSE Act is that some of its provisions, like the requirement for EIAs, do not apply retrospectively to land use and pollution etc already in existence before the commencement of this legislation. For the Act to have the desired impact and effect in the collective effort to protect and conserve the environment, it should be amended to ensure that all land uses currently in place should be subjected or required to undergo EIAs.
- Currently, there are no provisions in the LSE Act dealing with air and noise pollution. Perhaps as a start, this aspect could be addressed through appropriate regulations under the LSE Act.
- Under the LSE Act where litter or wastes are dangerous/hazardous or toxic, individuals can be imprisoned for up to a month but there is no corresponding set of fines perhaps more severe and harsher (like imprisonment etc) for corporations and companies in the private sector - who are likely to be the more serious offenders.
- The current legislation does little to effectively protect the environment. Penalties consisting of small fines and short imprisonment terms do little to rectify the problem, let alone act as a strong deterrent for people not to offend. Government should send out a strong message that it is serious about protecting and conserving the environment. Fines for environment related offences should be increased with higher fines imposed on corporations and private businesses.
- The Environment Board should be activated in order to fulfil its role as envisaged under the Act
- Provisions should be made to promote the sustainable use of marine resources and to control marine pollution as regulations can be made under the *Exclusive Economic Zone Act 1977* – although no such regulations have been done and the marine resources remain unprotected.
- There is a real need for a better and more coordinated approach between all departments, agencies and NGOs, which have a stake in the protection and conservation of the environment so that accountabilities and responsibilities are more clearly defined to avoid unnecessary duplication of effort and wastage of scarce resources.
- The Government to seriously consider the recommendations of the 1993 legislative review.

Policies

- Complete all other policies proposed in NEMS to address the 12 target environment components,
- Encourage more cross-sectoral participation from all relevant stakeholders (business community, local communities and NGO's) that will assist in enhancing the development of environment policies,
- Have all environment policy formulation transferred from DLSE to Ministry of the Prime Minister, as proposed in the restructuring of Government Departments and Corporations (January, 2002) for Samoa. This suggestion is in line with the current trend of political involvement for Samoa in the global arena advocating developed

countries on the needs of SIDS. As well, endorsement of environment international conventions and signing of agreements warrants the participation of the Prime Minister.

- Implement other line policies parallel to the NEMS policies in furthering the stand of legal instruments to enforce sustainable development approaches that prioritises environmental concerns.
- Review all existing Acts, Policies and Regulations that have been in effect prior to 1992. This will minimize the growing constraints between departments on the overlap of activities and provide a sound climate for an integrated operational arrangement between all government departments and relevant stakeholders.
- Consider the existing draft EIA Regulation and decide upon changes to be made in order to facilitate approval and endorsement.
- Strengthen political commitment and support for environmental issues not just in the international arena but also at the national level in reviewing legislations from all government departments or corporations and transfer any provisions from these Acts to DLSE as the main department mandated with the monitoring, sustainable management and assessment of Samoa's natural resources. This should be done parallel to the reform programme proposed for DLSE.

Institutional arrangements:

- There has been quite a lot of effort made by GOS through its public and private reforms in strengthening institutional capacities of all departments and line agencies together with the involvement of private operators in this area. Much of this programme is yet to eventuate in the near future. Therefore it has been anticipated that;
- The government will be more focussed on consolidating its partnership with the private sector in outsourcing much of its service provider activities, to maintain a sustainable drive in meeting its international obligations and providing an efficient service to the people of Samoa with an integrated approach to both development and environment programmes across-sectoral.
- DLSE will continue to review its Corporate Plan annually to monitor its progress of development and take into actions any changes that may have adverse impact on the environment, as the leading agency for sustainable management of Samoa's natural resources.
- In recognition of DLSE being the stewardship for sustainable development and management of Samoa's environment, proposed changes has been suggested for renaming the department as the Ministry of Environment and Natural Resources (PSC proposal to cabinet), whereas the IAMP review (2001), suggested the department to be called Department for Environmental Management and Development. Hence both these recommendations are yet to be selected and finalized according to whichever is approved by cabinet.
- A new division in DLSE is to be established soon to house new changes made within the department, and this Division will be the Urban and Planning Division to take on the responsibility of planning an Integrated Urban Development and Management System for Samoa, as well as other relevant tasks or projects.
- There is still a need to encourage more involvement of environment stakeholders in the implementation of environment programmes, if DLSE moves into a monitoring, regulatory, supervisory and advisory role than public awareness and other activities should be taken up by NGO's and communities to enhance their capacity in addressing environmental concerns.
- There is a need to better define the partnership arrangement between the government and NGOs including a mechanism for consultation and dissemination of information including decisions made.

- Other institutional programmes currently implemented by DLSE including CIMS has long term plans of developing national guidelines for wider land and resource management within the integrated coastal zone. Thus maintaining a sustainable management approach that can address any hazardous effects from natural or man-made catastrophes.
- The formulation of the NBSAP will provide a wider framework for balancing the conservation and protection of biological resources in light of continuous developments in areas of infrastructure, agricultural and expansion of settlement areas.

Specific projects and programmes

Samoa has sustained the momentum of updating existing programmes that were highlighted in the NEMS (1993) such as; protected area systems, species conservation programmes, and waste management. There has been an increase in new programmes as a result of Samoa being a contracting party to international/regional agreements and protocols. In order for these programmes to be effective and yield lasting impact the central agency for environmental issues would need to consider the following:

- Conduct more research on ecological values of ecosystems to continuously update its information on the status of ecosystems and its impact on species biodiversity.
- Redesign programmes currently implemented to be in line with the national strategies and take on a participatory approach to gauge community involvement.
- Seek more financial assistance and expertise to assist in further development and sustainable management of Samoa's natural resources.
- Have an integrated approach in implementing current programmes, such as POP's, Climate Change, Montreal Protocol on ODS, Marine Protected Areas and International Waters to include all relevant stakeholders.
- Sustain all these programmes in the long term through government taking the leading role in providing local budget provisions to conduct some activities of these programmes, such as public awareness and policy formulations.
- Engage in developing highly skilled and specialised staff particularly those with the capabilities to compile and store data on various environmental concerns; such as biodiversity, climatic patterns, monitoring of waste generation and a geographical information system that can monitor the changes in Samoa's natural resources.
- Seek assistance for technology transfer from places similar to Samoa where best practices have been proven.
- There is a need to consolidate the collation and collection of data on traditional practices and knowledge which must be an integral part of future assessments.

CONCLUSION

Samoa has demonstrated remarkable economic growth in the past decade as it balances a shift between an agricultural and a tourism and services oriented economy. As the formal economy continues to grow, the possibility of growing pressures which can bring about a vulnerability to poverty cannot be totally excluded. This entails the risk of more crime and environmental pressures and a weakening of cultural norms and outcomes and these elements can jeopardise the sustainability of policies unless they are tackled in time and in an appropriate manner.

The Government however is aware of the threat and; it continues to provide support for a revitalised village economy the mainstay of which is agricultural production and creating the basic infrastructure which can help improve rural living conditions. The bulk of the population is village based, living mainly on resources provided from customary land in the form of susbsistence as well as cash crops supplemented by remittances. The government continues to encourage interest in agriculture and to improve further economic and social conditions in the rural areas.

In the longer term, sustainability can only be achieved if environmental concerns are addressed as a matter of priority. High consideration is accorded environmental issues in the context of the Government's economic strategic plans because of Samoa's reliance on a sound environment for its agriculture, fishery, forestry health and tourism sectors.

Appropriate legislations such as that for environmental impact assessments have been prepared and must be fast tracked for the formal approval and eventual implementation processes. To address sustainability of some of the key natural resources, medium to

long-term plans for their development have been drawn up. There are parallel programmes running to enhance public awareness of the importance of resource conservation and further justifies the need to integrate environmental issues into the mainstream development agenda.

Samoa is committed to meet the challenges through political will, understanding and support of sustainability issues by everyone, the active interaction of civil society and the realisation by the private sector that there is no inherent contradiction between economic development and the protection of the environment.

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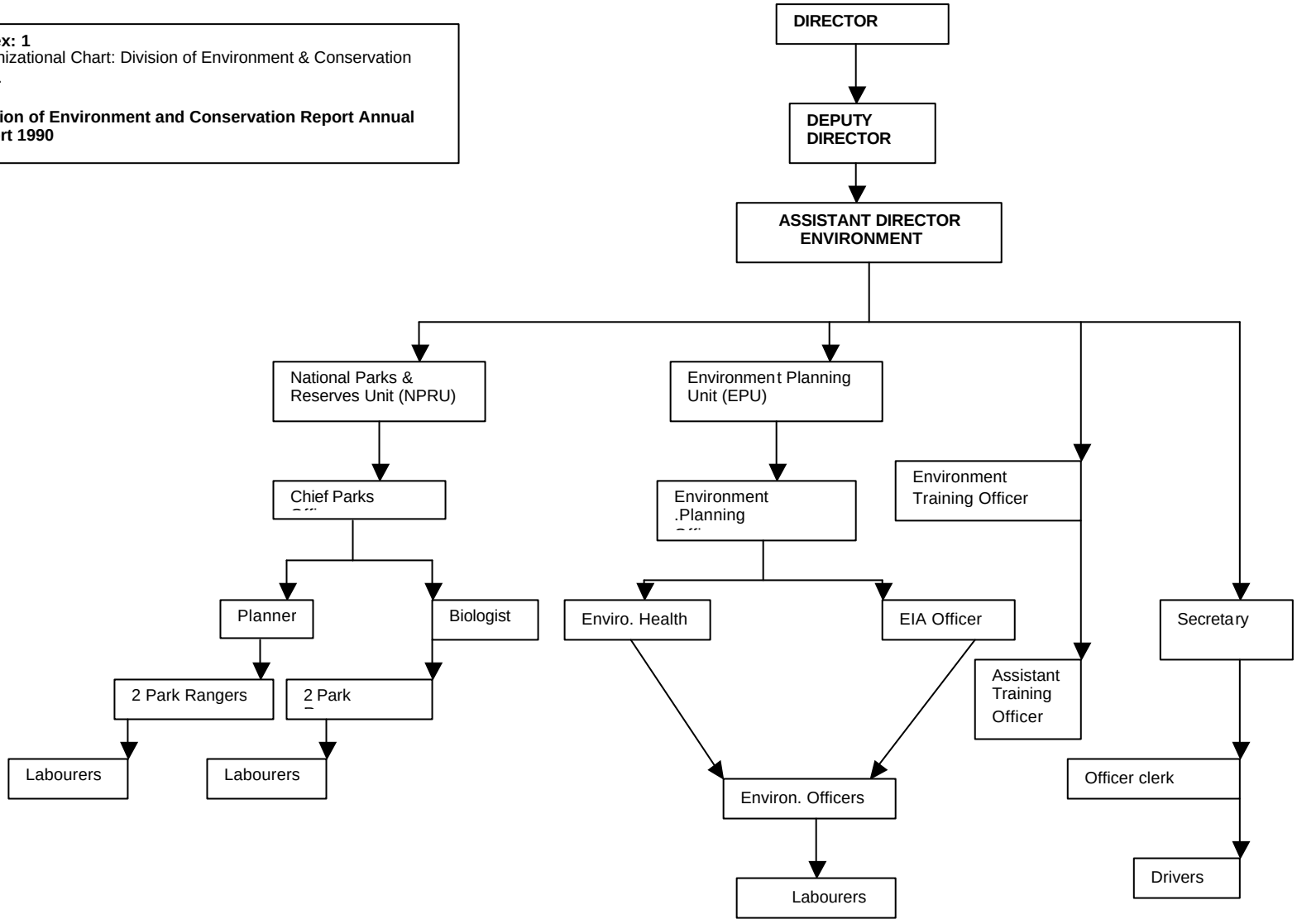
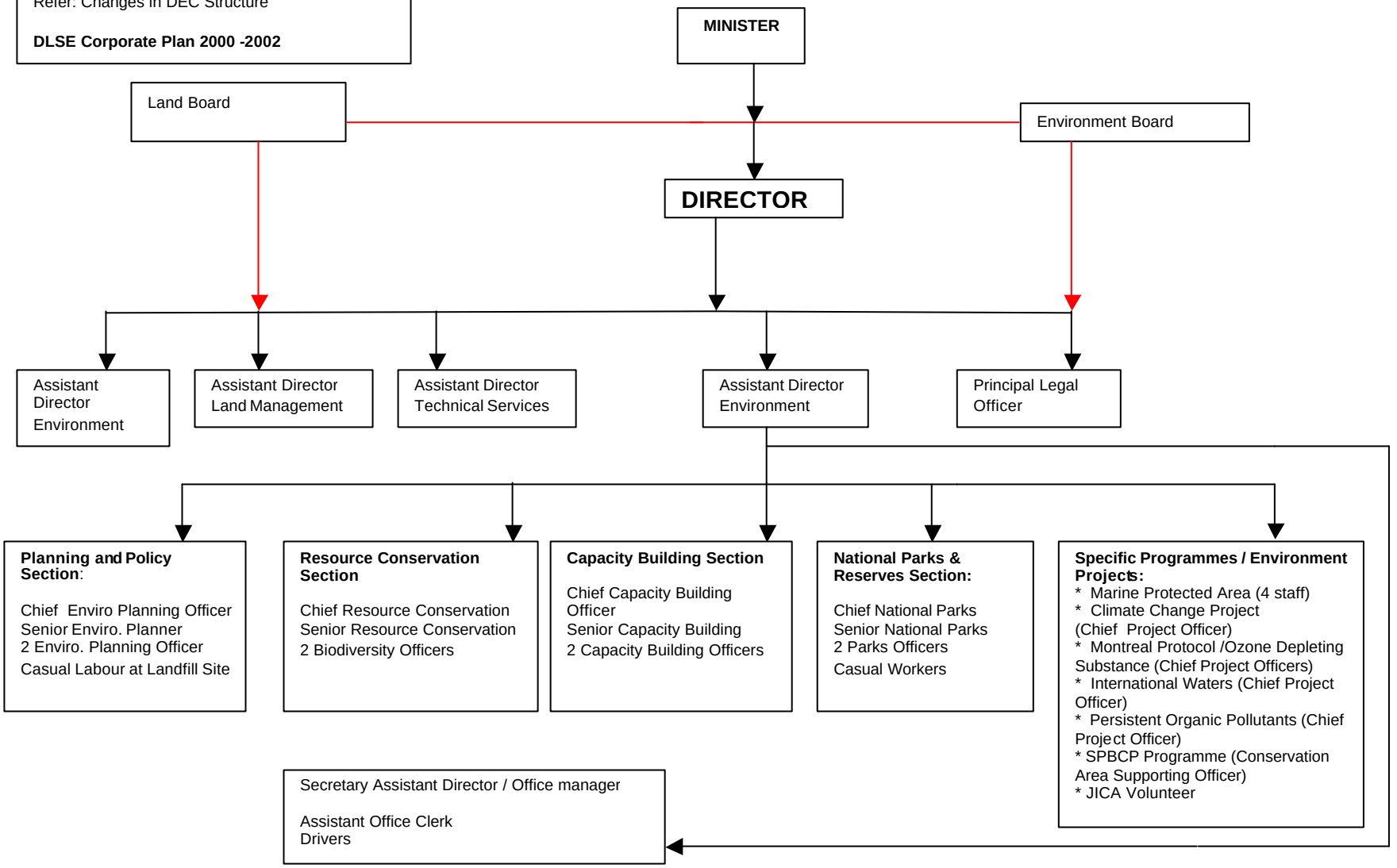
Annex: 1
Organizational Chart: Division of Environment & Conservation 1990.

Division of Environment and Conservation Report Annual Report 1990



Annex: 2
DLSE: Organizational Structure 2001
Refer: Changes in DEC Structure

DLSE Corporate Plan 2000 -2002



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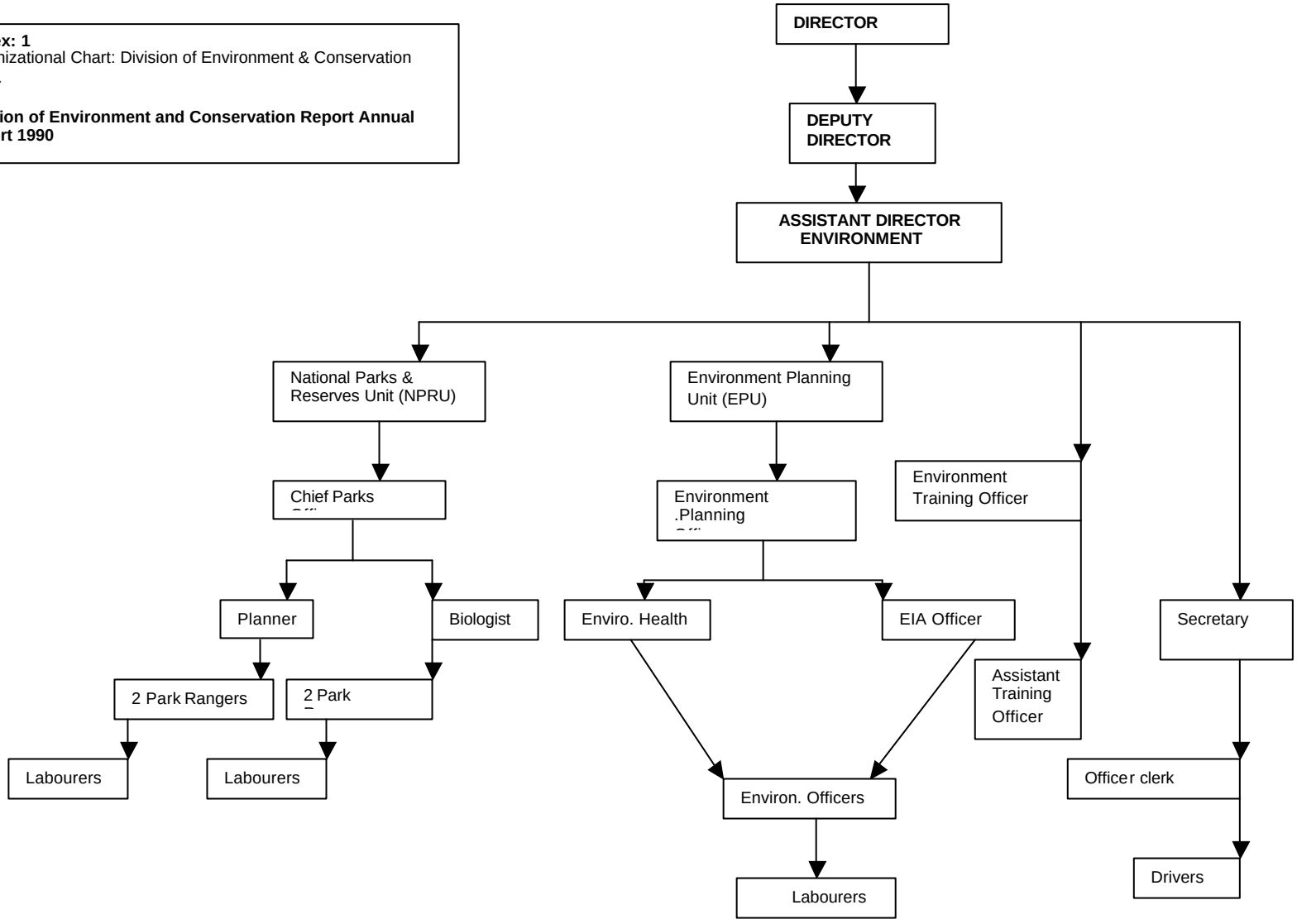

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