Samoa's

First National Report:

United Nations Convention to Combating Desertification

Prepared by:

Department of Lands, Surveys and Environment

Government of Samoa

EXECUTIVE SUMMARY

Samoa acceded to the United Nations Treaty to Combat Desertification on 20 August 1998 four years after the Convention was adopted in Paris on 17 June 1994, and two years since the Convention entered into force on 26 December 1996.

Since the landmark Earth Summit in Rio de Janeiro in 1992 and since becoming a Party to the Convention, Samoa has already ventured forth in its drive to implement other international conventions such as the United Nations Framework Convention on Climate Change (UNFCC), Convention on Biological Diversity (CBD), Convention on Ozone Depletion Substances (C0DS) to name a few. Constraints on human resources have delayed the initiative to set up the administrative machinery within the Department of Lands Surveys and Environment as the Implementing Agency for the Convention to undertake the necessary work for the fulfillment of Party Obligations by Samoa under the Convention. As part of the Department's Institutional Strengthening Program manifested in the establishment of a new Planning Division within the framework and structure of the Department known as PUMA (Planning and Urban Management Agency) staffed by Senior staff of the Department's Environment Division; as well as the assignment of the administration of the CCD to the Land Management Division of the Department in recognition of the fact that Land Degradation as it affects Samoa is a land-related matter.

A Consultancy commissioned by the UNDP-GEF Strategic Partnership's Capacity Development Initiative (CDI) in its report dated 21 July 2000 on the subject of 'A Rapid Assessment of Land Degradation in Samoa' reported that 'There is a general consensus of opinion that-at least for the moment-there is no widespread evidence of land degradation in Samoa. However, in some well delineated areas, such as the watersheds and catchment areas around Apia urban area and in NW Savaii, a variety of factors interplay to produce a situation where land degradation now has become an issue.' Since that time, the commercial mining of sand which has intensified in the past two years has accelerated coastal erosion and land degradation around the country in areas where sand accumulation and deposits are found, conducive to the manufacture of bricks and other concrete-related products for use in the building and construction industry.

The first Stakeholders' Consultation convened on Wednesday 9 October 2002 was well attended by representatives from government departments, government corporations, the private sector including representatives from SUNGO (Samoa's Umbrella Non Governmental Organisations) as well as members of the general public. Participants at the Workshop identified Land Degradation as the dominant issue of Desertification affecting Samoa and appointed a National Task Force to spearhead the preparation of Samoa's Second National Report and more importantly, to prepare the National Action Plan for Samoa. In the course of the first Stakeholders' Consultation, contact was made with Dr Eletise Taauta Suluvale who graced the staff of the Land Management Division, the local coordinators of the UNCCD with a copy of his thesis entitled 'The Role of Contaminants in Altering the Coastal Environment of Samoa'. Some of the materials contained in this Thesis are quoted and used in this report for their reliability and simplicity.

As with the implementation of other international Conventions, funding is a crucial issue; and towards this end, Samoa is grateful to the Secretariat of UNCCD for making available a small grant of $4,625USD which has made possible the holding of the first Stakeholders' Consultation as well as meetings of the Task Force to be convened in the near future as well as other Stakeholders Consultations necessary as a lead-up to the preparation and submission of Samoa's Second National Report and Action Plan.

ACRONYMS

ADB	Asian Development Bank
CBD	Convention on Biological Diversity
CEIS	Coastal Environment and Institutional Arrangement
CIMS	Coastal Infrastructure Management Strategy
CMP	Coastal Management Plan
CODS	Convention on Ozone Depletion Substances
DEC	Division of Environment and Conservation
DLSE	Department of Lands, Surveys and Environment
ENSO	El Nino Southern Oscillation
GEF	Global Environment Facility
GoS	Government of Samoa
IAMP	Infrastructure Asset Management Project
ISP	Institutional Strengthening Programme
LMD	Land Management Division
MAFFM	Ministry of Agriculture, Forestry, Fisheries and Meteorology
METI	Metuaileoo Environment Trust Inc.
MFA	Ministry of Foreign Affairs
NBC	National Beautification Committee
NEMS	National Environment Management Strategy
NGO	Non Government Organisation
NPPSD	National Planning for Population Sustainable Development
PEIN	Pacific Environment Information Network
PIC's	Pacific Island Countries
PICCAP	Pacific Island Climate Change Assistant Programme
PUMA	Planning and Urban Management Agency
SDS	Strategy for the Development of Samoa
SIDS	Small Island Developing States
SLC	Samoa Land Corporation
SPBCP	South Pacific Biodiversity Conservation Programme
SPREP	South Pacific Regional Environmental Programme
TEC's	Target Environment Components
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WESTEC	Western Samoa Trust Estate Corporation
WSSD	World Summit on Sustainable Development Assessment Report for Samoa

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BACKGROUND

When Samoa acceded to the Convention to Combat Desertification on 20 August 1998, nothing had been done up to that time to address the process of desertification, a phenomena induced by forces of nature as well as human activities. Obviously, there is an urgent need for Samoa as an affected party member of the Convention to research the process of desertification as it affects the world with particular focus on Samoa in order to understand and appreciate the consequences of desertification as a universal problem with severe repercussions on the countries of the world and their populations.

'Land Degradation is the reduction of land resource potential through desertification and deforestation. The contributing factors include:-

- Soil erosion, denudation, pollution, loss of organic matter, and loss of fertility
- Loss of vegetation cover, and alien invasive species that result in loss of cover.
- Habitat conversion (urban and agricultural)
- Aquifer degradation, leading to loss of soil cover.'

(Source:- UNDP/GEF Guidelines for Preparing GEF Projects in the Cross-Cutting Area of Land Degradation). The processes involved by this definition require close examination and research in order to arrive at a clear understanding and appreciation of the problem. This in turn would assist with any coordinated effort to formulate an action plan that would address this problem as it affects Samoa; and would enable Samoa to fulfil its obligations as an Affected country party under the Convention.

Research done by Dr Suluvale leading up to the presentation of his doctoral Thesis in December 1997 titled 'The Role of Contaminants in Altering the Coastal Environment of Samoa' is an acknowledgement of the existence of the problem of land degradation as it affects Samoa's coastal landscape and environment. His findings show that, 'In the case of non-urban streams, it is apparent that many streams displayed high turbidity and suspended solid values. The main factor contributing to these results is the unregulated clearance of native forests to make way for family plantation expansion (Taulealo 1993). Not only are the native forests cleared, but Samoan families actively maintain a weed-free plantation environment, which sometimes promotes the exposure of soils to rain splash action and the resultant movement of particulate matter downslope and downstream. As noted by Stednick (1990), the clearance of plantation and forestlands and particularly the practicing of shifting agriculture on steep slopes and riverbanks without buffer zones, is common in the Vaisigano Catchment. The role of cyclones in clearing forests was very evident in 1990 and 1991 when Ofa and Val struck (Chase and Veitayabki 1992).

Despite the unpleasant situation with regards to contributing factors and consequent effects as disclosed above, evidence of land degradation in Samoa is somehow generally viewed as minimal. Yet according to preliminary assessment of land degradation carried out by Walter Vermullen (2000) as part of the Capacity Development Initiative (CDI) in partnership with UNDP-GEF, some parts of the country are potentially threatened due to tree felling around water catchment areas and deforestation for subsistence and commercial agriculture. A proper survey to identify degraded land areas in order to determine the level of resource depletion, and loss of land productivity and contamination of the environment is yet to carry out or considered within the framework required of this Convention. However estimation can still be made according to current landuse patterns associated largely with socio-economic activities from the increasing population and development and, land use transformation induced mainly by climatic factors and other natural threats. This estimation can be derived from census studies of various sectors such as subsistence and commercial agriculture in light of agro-forestry plantation including livestock and various types of crops and logging of substantial areas; population census and ratio of land allotment; land tenure system; penetration of infrastructural development on the coasts and much of the interior; and exploitation of various natural resources.

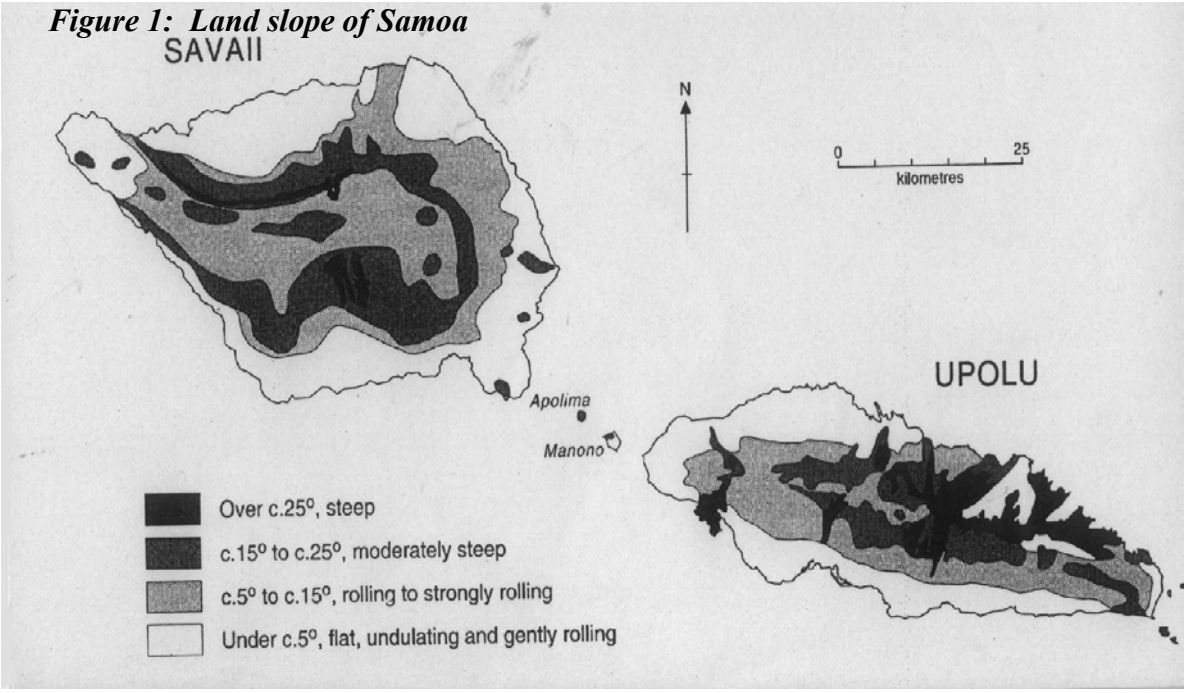
Although a number of sustainable measures have already been put in place to counter numerous environmental concerns with much of Samoa's depletion of its resource base in terms of loss in biological diversity of fauna and flora and, marine biodiversity, but there exists drawbacks that limited effective implementation of sustainable actions to ensure reversible favorable land conditions to their former state. These include issues pertaining to land tenure, enforcement, types of farming methods,

1 THE NATIONAL SETTING

1.1 Location & Topography

Samoa is a small island nation in the South Pacific (comprising the twenty two island nations that make up the members of the South Pacific Regional Environment Programme (SPREP). Samoa is located between latitudes 14o 10' and 13o20' South and longitudes 171o20' and 172'50' West. The capital city of Apia is approximately 4,500 kilometres northeast of Sydney, Australia, 4,235 kilometres south-west of Hawaii, and 2,500 kilometres northeast of Auckland New Zealand (GWS 1966). The total land area of 2,935 square kilometers consists mainly of the two larger islands Savaii and Upolu with land areas of 1,825 square kilometers and 1,100 square kilometers respectively. Two other inhabited smaller islands Manono and Apolima and several smaller uninhabited islands make up the remaining land area. Samoa has an exclusive Economic Zone of approximately 130,000 square kilometers (SPC 1982), and a total reef and lagoonal area (where water is less than 5 metre deep) of 23,100ha (Johannes 1982). Settlement is concentrated almost entirely along the coast in a series of villages.

Figure 1: Land slope of Samoa



[Ward & Ashcroft 1998]

1.2 Climate and Weather

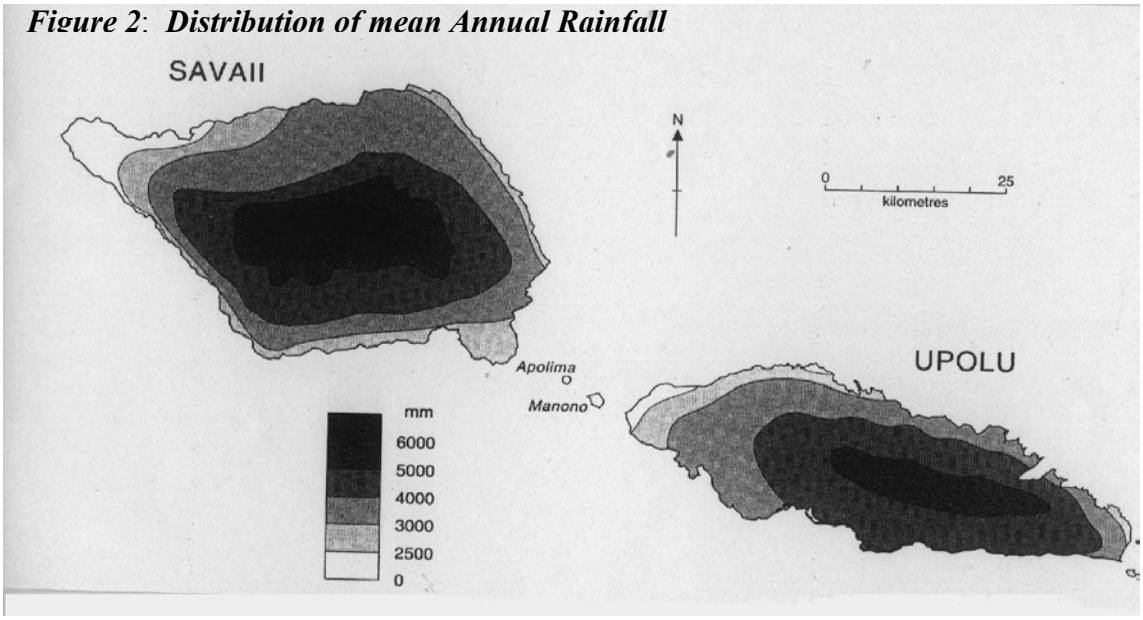
The climate of Samoa is tropical typified by high humidity and heavy precipitation occasionally accentuated by severe cyclonic storms during the wet season from November to April (Douglas and Douglas 1994). The South Pacific Convergence Zone (SPCZ) which extends north-west to south-east across the region dominates the climate of Samoa. According to Steiner (1980), Samoa lies just south of the SPCZ during the months of May to October, during which times the south-east trade winds predominate. Most rainfall at this time of the year is orographic and the islands experience a dry season from May to October (Falkland and Brunel 1993; Nunn 1994). In the months of November to April, Samoa lies north of the SPCZ and winds are mostly the divergent easterlies. During these months, the SPCZ is more active and persistent, with small

cyclonic disturbances common, which often develop into tropical storms or hurricanes. This is the wet season in Samoa.

The predominant winds affecting Samoa are the south-east trade winds, which blow for over 80% of the time in the wet season, and about 50% in the dry season. Average wind velocities are around 20km/hr, with gusts above 48 km/hr occurring less than 0.5% of the time. Although the country does not lie on the cyclone belt, it was hit by two severe cyclones recently. Cyclone Ofa in 1990 and Cyclone Val in 1991. Wind speeds of up to 180km/hr were measured during the cyclones which devastated most of the roads, buildings, plantations, forests, coastal areas and reefs of the country (Chase and Veitayabki 1992).

Samoa experiences small variations in temperatures due to its equatorial location. The mean maximum temperature ranges from 27 to 30degrees Celsius and the mean minimum temperature range from 20^{o}C to 23^{o}C (Chand 2000). The average annual temperature is 26.5 degrees in the coastal areas, but overall temperatures are consistently warm. The warm humid conditions cause some discomfort but often are moderated by the wind. The average annual rainfall ranges from 2000-7000 mm. Although most areas receive more than 4000 mm, the highlands of both main islands receive 5000-7000 mm, whilst the North West coastal areas of Upolu and Savaii receive 2000-3000 mm (ibid). The relative humidity averages 80% and an average of 2,500 hours of sunshine per annum.

Figure 2*: *Distribution of mean Annual Rainfall



[Ward & Ashcroft, 1998]

1.3 Natural Resources

Samoa has limited natural resources. It is ecologically fragile and vulnerable to environmental degradation. Samoa does not have any known coveted minerals nor oil deposits except '*land'* and *marine biodiversity*. On the social side, these resources serve as sources of identity and security for the people.

1.3.1 Soil resources

The most extensive soil order in Samoa is that derived from volcanic ash called *andisols* and most are found in upland areas under isothermic temperature regimes.

Table 1. : Temperature regimes

STR	Mean Annual Soil Temperature	Temperature Range (^{o}C)	Occurrence
Isomesic	< 15	< 6	Savai'i highlands
Isothermic	<15-22	<6	Interior uplands of main islands above 700 after the elevation
Isohyperthermic	=22	<6	Other parts of the country

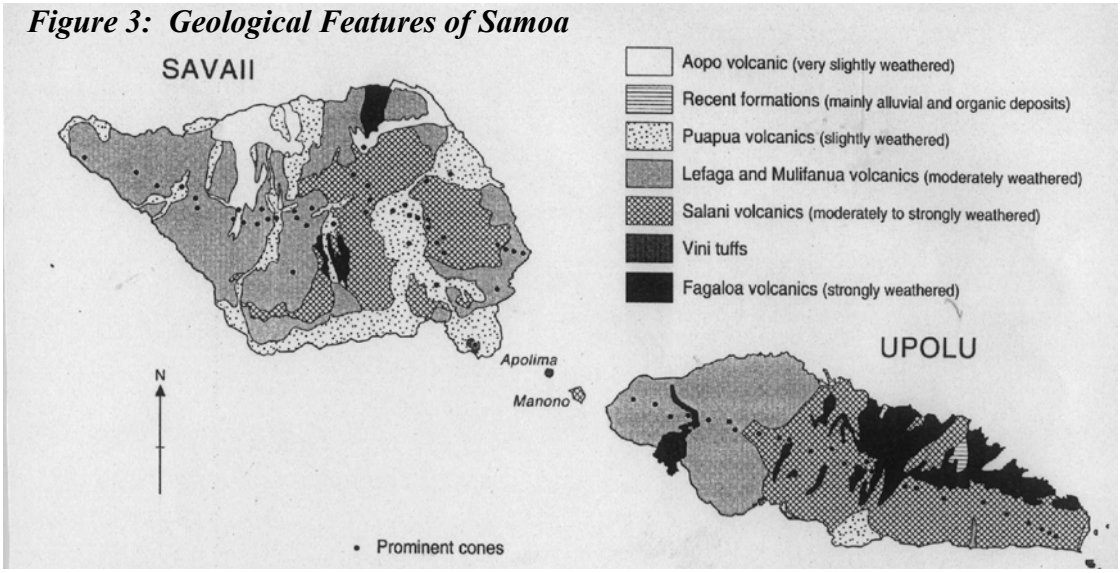
Source: FAO – State of the World's Forests 1999

The parent material of most soils is olivine basalt. Soils are predominantly stony latosols of varying fertility. Soils are generally low in potassium and/or phosphate. Equitable rainfall, temperature and good soil properties tend to minimize the impact of relatively low fertility on plant production.

Most soils of Samoa have good structure and subsoils are not compact. Most soils are friable, and when moistened, are non-sticky and non-plastic, free draining with low water-holding capacity.

There are marked differences between the soils of the lowlands and the uplands and between these soils and those of the highlands. There tends to be an increase in thickness of mineral soil with increasing altitude, due largely to heavier ash deposition in the uplands and the highlands. Upland soils are not generally used for cultivation.

Figure 3: Geological Features of Samoa



[Ward & Ashcroft 1998]

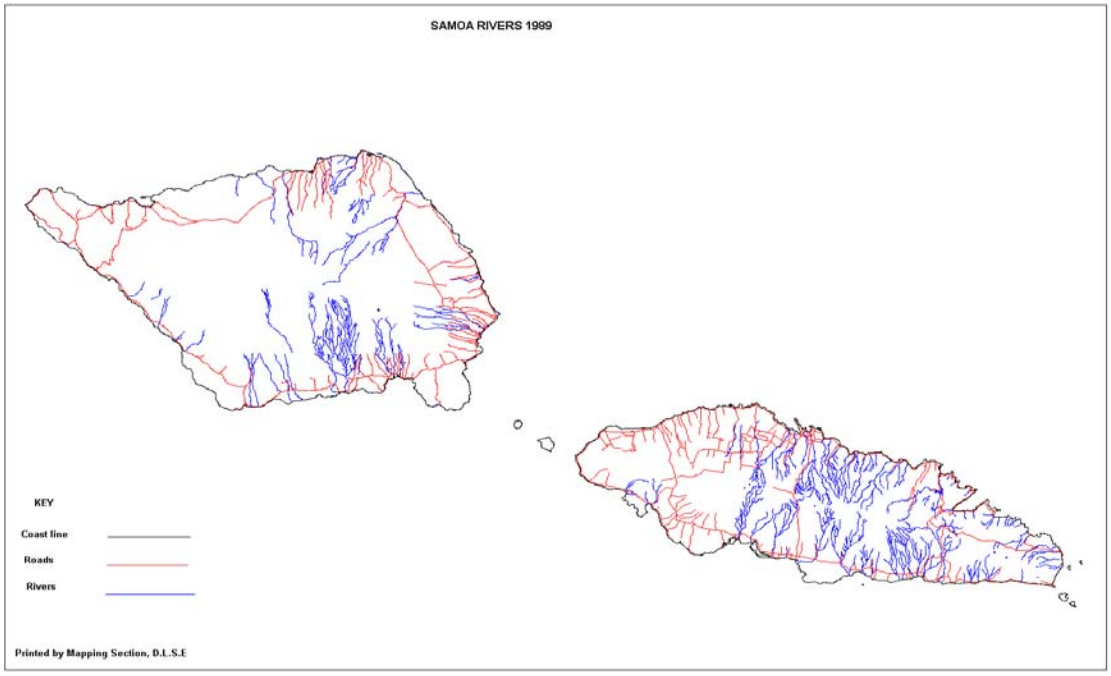
1.3.2 Water resources

Fresh water is a fundamental resource for any small island nation and Samoa is no exception. More than three-quarter of Samoan population has access to piped water.

However, there is a high rate of water loss through leakage because of weak infrastructure and wastage as a result of poor conservation measures.

The volcanic origin of Samoa has resulted in terrains that have abundant streams and waterfalls. Despite this, the western part of Upolu and the larger parts of Savaii lack any surface water because of the highly permeable nature of soils and the Mulifanua volcanic rocks. Thus, groundwater and rainwater catchments are the common sources of water in these areas.

Figure 4: Rivers of Samoa



River flows provide the main source of water supply although on Savaii there are many coastal springs. During much of the annual dry season, rivers dried up except during occasional heavy precipitation. In many areas, water supplies are insufficient to meet local demands for drinking water and domestic cleaning.

In the urban area of Apia, water supply and quality was declining because of the greater velocity of water flow from cleared watershed areas. Some areas of Savaii also experience periods of severe water shortage throughout the year. Some rainwater is collected in tanks and like in areas where rainfall is markedly deficit and thus consistently deprived of rainwater supply, heavy reliance on water tanks is inevitable. A few water catchment areas have also been identified and established to ensure adequate and continuing supply of water to households throughout the whole country, all year round.

Despite high rainfall, all surface water sources dry up for 3-6 months of the year largely due to the high porosity of the soil. The parts of West Savaii and north-west Upolu which are in the rain shadow are almost devoid of surface streams, and suffer chronic water deficiencies. The major threats to an adequate water supply are continuing clearance in water catchment areas for plantation and cyclone damages.

1.3.3Forest resources

Land resources extend from the coastal lowlands to the highest upland peak. Apart from sand and aggregated materials for construction and landfill, the most valuable land resource is *forest* and its *ecological biodiversity*. Samoa is mostly covered with lush vegetation. The interiors of both islands are predominantly covered by montane forests with cloud forests clothing the highest altitudes of Savaii. These forests and shrubs have catered for demands from timber industries, construction materials and provided household with food delicacies such as bats and pigeons. Other uses include wood for fuel, handicrafts, traditional housing, boats, other household items, and traditional medicines for generations, of which 150 species (FAO 1999) of Samoan plants have been used for medicinal purposes.

Forest in the country is unique in its biodiversity. It supports 775 (FAO 1999) vascular plant species, of which 30% is found elsewhere. There are more native flowering plant genera in Samoa than in any other archipelago in Polynesia. There are 21 butterfly species and 11 species of reptiles, including 7 lizard species and 1 snake type. There are 43 resident bird species, of which 8 are found and non-existent elsewhere (FAO 1999).

1.3.4 Marine resources

Marine resource base in Samoa is also very fragile. The mangrove, lagoon and coral reefs house an enormous diversity of marine invertebrates, many of which are harvested as food. The *palolo reef worm, which rises once or twice a year,* also holds a great cultural significance to Samoans. Fourteen (14) threatened species have been identified and these include numerous corals and clams, and the coconut crab (Schuster 2000).

Coral reefs are fragmented in most places because of the nature of the country's topography, mostly resulting from recent volcanic flows which has either covered or destroyed previous reef areas and left rocky coasts with no reef. Coastal lagoons are reasonably shallow and vulnerable to industrial and domestic pollutions.

Mangrove communities are not abundant in Samoa but they are crucial in providing local communities with supplies and restock of inshore fishes and shellfish, and wood for fuel and provide many other uses. The largest area of lagoon in Samoa is Vaiusu Bay in Apia which houses the largest mangrove area in East Polynesia (Taulealo 1993). The remaining mangrove areas are under enormous pressure for land clearance and reclamation such as Taumeasina. Concerns over the increasing degradation of mangrove communities has lead to regional and national efforts to conserve large tracts of mangrove areas in Saanapu and Sataoa, situated south-west of Upolu.

1.4 Population

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.

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).

Table 1.4: Population Census 1991 - 2001

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**

(WSSD Report 2002)

1.5 Economy

Samoa's economy has been stable over the last decade since the government diversifies its support and economic focus, from traditional mainstays such as agriculture and remittances, to tourism and fishery industry. The mid-1990's, after the devastating wrath

of cyclones Ofa & Val and the taro leaf blight which impacted adversely on agricultural production, saw the government according high priority to the development of these two sectors.

Economic reforms of the 1990's have resulted in 10% (SDS 2001) growth rate with vigorous private sector development, compatible with the leveling playing-field strategy by the government. Manufacturing, construction, private services, fishing, transport and communications, electricity and water, and hotels and restaurants all did well. However, agriculture declined by about 16% (ADP 2002) as subsistence production fell and efforts to diversify production for export remained unsuccessful. Fishing continued its expansion with the introduction of new, larger fishing vessels. In contrast, tourist arrivals were down somewhat because of the impact of the September 11th tragedy.

Total export revenue was strengthened by about 20% in 2001 due to a surge in fresh fish exports and further growth in garment exports. Imports were about 31% higher than in 2000, with non-oil private sector imports accounting for most of the rise. The merchandise trade deficit fell to $79.8 million from $90.8 million (ADP 2002). Despite the stronger earnings from tourism, and increased private remittances, the current account surplus as a share of GDP declined slightly. Even with a higher surplus on the capital account, the balance of payments was in overall deficit. Foreign exchange reserves dropped and provided about 4.8 months of import cover at the end of the year, compared with 6.4 months in the previous year. As a proportion of GDP, external public debt declined from 64.8% to 60.2% (ibid) at the end of the fiscal year. Debt service costs amounted to 18.5% (ibid) of merchardise exports. During 2001, the effective exchange rate of the tala remained stable in nominal and real terms.

Overall, economic performance is encouraging and success is generally attributed to reforms.

2. THE NATIONAL POSITION TO COMBATING DESERTIFICATION

Samoa accessed the United Nations Convention to Combating Desertification (UNCCD) in 2001. Other Conventions to which Samoa is also Party such as UNFCCC, CBD and International Waters also indirectly address related issues and manifested problems associated with desertification and land degradation. Samoa is an *Article 5* country under the Convention and it is, by UN classes an '*Affected developing country Party*'.

2.1 WHAT IS DESERTIFICATION/LAND DEGRADATION IN SAMOA?

Desertification in the strictest definitive sense of the word varies in manifestation from region to region and country to country. For the Pacific region including Samoa, it is largely affected because of the '*diminution or destruction of the biological potential of the land*' (Grainger 1990), which is an aspect of the widespread deterioration of ecosystems under the combined pressure of adverse and fluctuating climate and excessive exploitation. This is the ultimate step of *land degradation* and irreversible in human terms. As well, it is within practicable economic limitations.

2.2 LAND DEGRADATION IN SAMOA

Samoa is comparatively small in size, ecologically and economically vulnerable and remote from major centers of production and consumption. There has been no empirical study to assess the current status with land degradation in the country or to determine the extent of the problem. However, areas where human-induced activities occur especially those areas that are commercially oriented are believed to be extremely degraded, not to mention random devastation of vast areas of land across the country incurred by cyclones of the early 1990's and almost every year during moderate to extreme weather instances of the wet and dry seasons. Land scars of the cyclones still remains to be fully recovered and soil fertility returned.

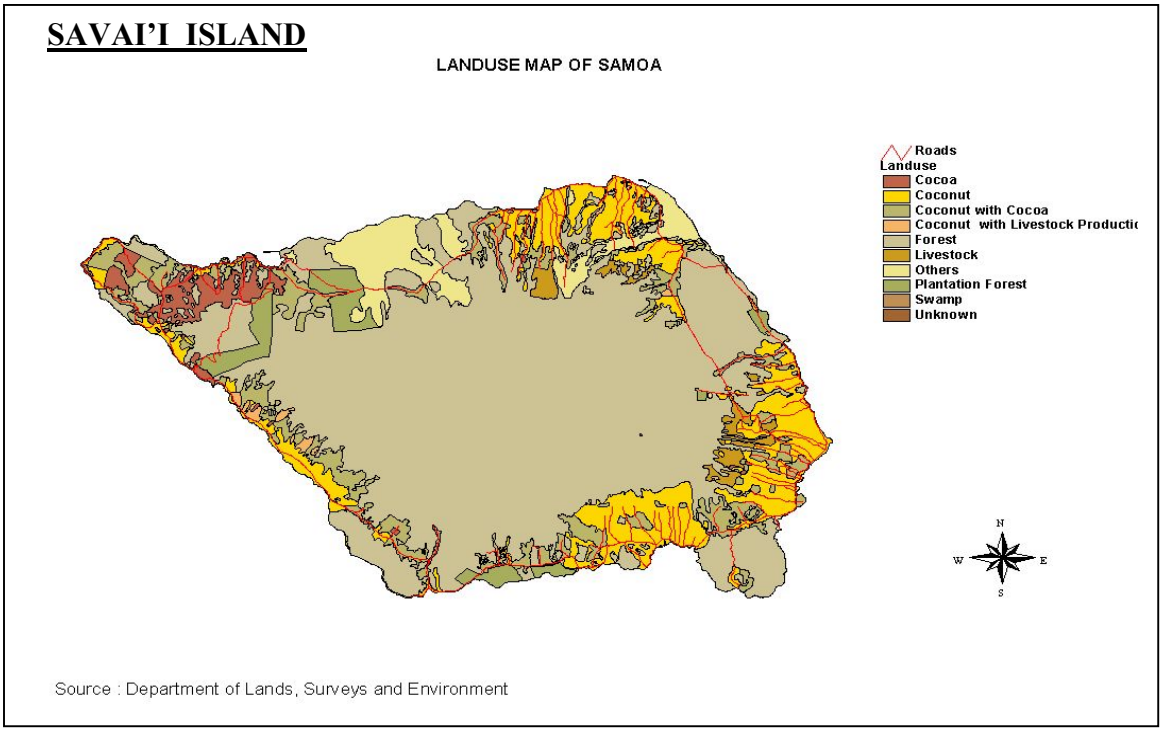
Agricultural practices and deforestation are viewed as the two most significant drivers behind land degradation. Also, climatic factors such as increased temperature and chronic rainfall deficit inducing droughts and; possibility of bush fires, pest diseases and sea level rise do equally contribute to soil infertility and land degradation. Areas that are mostly affected by climatic factors are villages at the far west of Savaii such as Aopo and Faleaupo and generally the whole Vaisigano district. Insufficient rain is very acute in these parts of the country throughout much of the year, especially given its remoteness and topographical location at the leeward side of mountains. Not only do these village communities experience drought-like conditions in which its land cover become more susceptible to bush fire incidents caused either naturally by lightning or by human carelessness but signs of poverty can also be observed due to lack of land productivity.

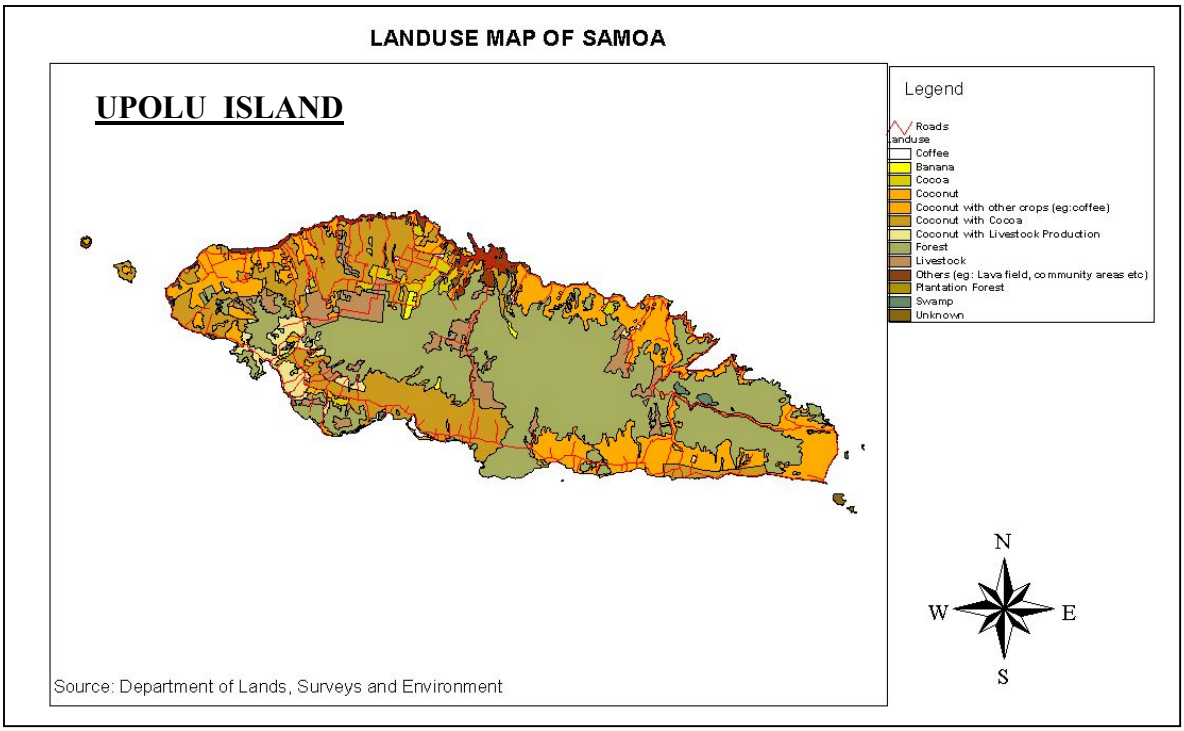
However, significant merchantable forests and vegetation are found in this particular area of Savaii. A timber sawn mill is likewise located there in Asau. Forest fires of the 1980's and the aftermath of 1990's cyclone have greatly destroyed significant hectares of merchantable forests of very high canopy layers.

There are several resource and environmental issues affecting sustainable development plan in Samoa. These include an array of issues related to land tenure, land use, water use, population growth, deforestation, and land clearance for agriculture, the use of fertilizers, climatic and sea-level variability, environmental degradation and pollution to resource management.

2.3 STATUS OF LANDUSE PATTERNS IN SAMOA

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. (WSSD, Government of Samoa, 2002).





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.(ibid)

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.(ibid)

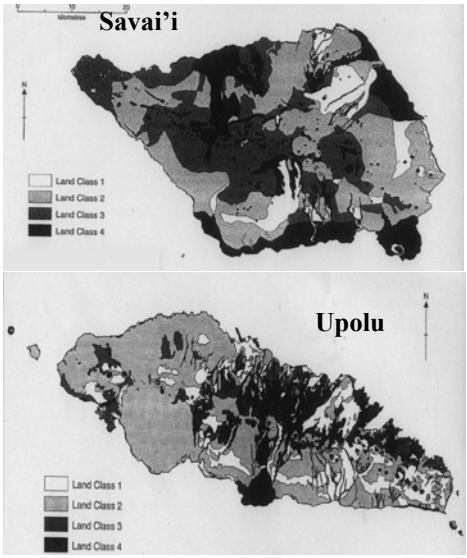
Table 2.3: Landuse Patterns 1998

Land use		
Land type	**Area (ha)**	**%**
Merchantable forest	13,574	4.6
Forest protected under village conservation agreement	3,089	1.1
Watershed areas	31,992	11.3
National Parks and Reserves	2,800	1.0
Land available for reforestation	10,000	3.6
Agriculture and crop land	98,000	34.7
Recent lava flows	11,433	4.1
Unproductive forest areas	111,112	39.4
Total	**282,000**	**100.0**

Source: FAO- State of the World's forest 1998

Table above summarizes the overall land use of the country.

Map 1: *Land Classes* (Ward and Ashcroft, 1998)



Key: Land Class 1 - Few limitations to agricultural use

Land Class 2 - Moderate limitations to agricultural use and few limitations to forestry use

Land Class 3 - Severe limitations to agricultural use and moderate to severe limitations to forestry use

Land Class 4 - Unsuitable for agriculture and forestry

Most people live in villages on or near the coast and normally they farm coastal strips and directly inland to the highest point or ridge line. Farming practices are increasingly concentrated on these marginal areas due largely to confinement of some villages in and around mountainous topography and coastal residential establishment. Apart from farming lands, other known uses of land are the removal of land resources such as sand and gravel for construction and landfill purposes. However, quantitative surveyed data on these marginal land activities is not available.

2.3.1 Land Tenure System

Samoan lands are sub-divided into three categories of which much of the land are customary (81%), government or public land (15%) and freehold land (4%). It is prohibited by law to alienate customary land and made freehold except for provisions enabling the leasing of land. It is also possible to take customary land for public purposes under the Taking of Land Act 1964. Customary lands was accounted for more than 400,000ha in the last 20 years; however it is markedly decreasing due to government and freehold leasing and taking by government for public use purposes.

Customary land ownership is viewed as a hindrance to development given that long-term security of tenure is essential for extensive agricultural or forestry development which features heavy investment in fixed assets. The unsure status of customary land holdings provokes small-holder long term projects such as pastoral or livestock development. It can also slow and sometimes halt national projects altogether, due to differences amongst landowners. While the government has the legal right to take land for national projects, this is not always done as settlement of issues is often achieved through negotiations with land owners.

There is increased pressure for land today particularly in the urban areas due to population growth as rural-urban migration continues. The demand for land is seeing an estimated 900ha (Hooper 1998) of forest lost annually to land clearance for gardens and for the creation of commercial plantations, which leads to consequences such as the degradation of water sheds and increased run-offs. To improve access to land, the government has subdivided huge tracts of lands that were under its trust estates to be sold as freehold sections or leased out for investment and development purposes.

2.3.2 Agriculture

The predominant land use apart from harvesting indigenous forests is agriculture. Although current production is declining in economic terms, but for more than three-quarter of the last century and beyond, it had formed the main backbone of Samoa's economy and subsistence living.

Agriculture is largely dependent on a limited range of crops for its own subsistence needs and for export. Taro, coconut products and cocoa have dominated exports for some considerable time, although other primary products such as timber and beef have also been developed.

Table 2.3.2: Types of Plantation Crops

CROP	AREA (ACRES)
Coconut	57,600
Cocoa	16,200
Taro	36,500
Ta'amu	8,100
Banana	5,600
Yam	600
Other vegetable crops	1,500
Total	**126,100**

Source: Chand 2000

At least two-thirds (80%) of households are still reliant on a mixture of subsistence and cash income, which constitutes about 76% of the entire population of Samoa. Even those employed in the wages and salary sector often supplement their incomes with agricultural production.

Agricultural census 1989 disclosed 77% (Reti 1991) of the total land area of land holdings under some form of cultivation. The remaining 23 percent comprises land under fallow (3%), bush (3) or under non-agricultural use (17%). The 1999 census found the average household controlled 9 acres compared to 15 acres in the 1989 census (MAFFM 2002). Potential fertile lands still exist. Populated areas under village tenure are under severe pressure to develop land of trivial economic worth. About 70% (481, 591.5 acres or 200,021 ha) of Samoa's land area is suitable for cultivation and cattle grazing (ibid). These include areas of marginal land requiring heavy fertilization for crop production and areas for cattle grazing of questionable viability above 600m elevation.

The present agricultural landuse pattern takes the typical form of blending two farming systems where subsistence village cropping (taro, bananas, other root crops, mixed vegetable gardens and a variety of minor crops) has had a plantation cropping system (coconut, cocoa) imposed upon it since European contact. These crops give the production system much flexibility. They serve as both food and cash crops, have a fairly flexible harvest period, and are grown successfully without much dependence on external technical inputs. They are often intercropped, and a variety of cultivars are used.

These qualities of crop resources provide for the resilience of the subsistence agricultural system, in the face of both natural hazards and market fluctuations. Its commercial significance still remains and the government in its Strategy for the Development of Samoa (SDS) is even promising a diversification of commercial agriculture for improvement in revenue from this sector.

2.3.4 Forestry

The forest industry comprises the logging of indigenous forests and the development of plantations. Most logging activities are done on the island of Savaii. There are 16,125ha (World Bank 1995) of merchantable indigenous forest remaining. It is estimated that some 30% of merchantable forest was lost in cyclone Ofa and some 300ha have been put aside under village conservation agreements. The government also operates a 2662ha (ibid) of plantation forests comprising 1800ha (ibid) of high valued species such as mahogany and lower valued but faster growing species.

Table 2.3.4: Landuse Change of Forest Cover

Country Data	
Total land area (thousand ha)	283
Total forest area 1995 (thousand ha)/% of total land	136
Natural forest area 1995 (thousand ha)	127
Total change in forest cover 1990-95 (thousand ha)	-8
Population total 1995 (million)/Annual rate of change 1995-2000	0.2
Rural population 1995 (%)	78.9
GNP per person 1993 in US$	980

Source: FAO – State of the Worlds forest

The country's merchantable indigenous forests are declining rapidly and at current deforestation rates (3.5% per annum), will totally disappear by 2005. Samoa has about 9,000 ha (Thaman & Whistler 1996) of plantation forest in its effort to recover the extensive damage caused by cyclones Ofa and Val. However these cannot immediately replace the indigenous resource as the main source of domestic sawn timber and wood. Consequently, the small volume of indigenous logs remaining and the delay in the availability of the plantation forest production indicates a shortfall in sawlog supply, at least until 2020.

2.3.5 Pastoral Farming.

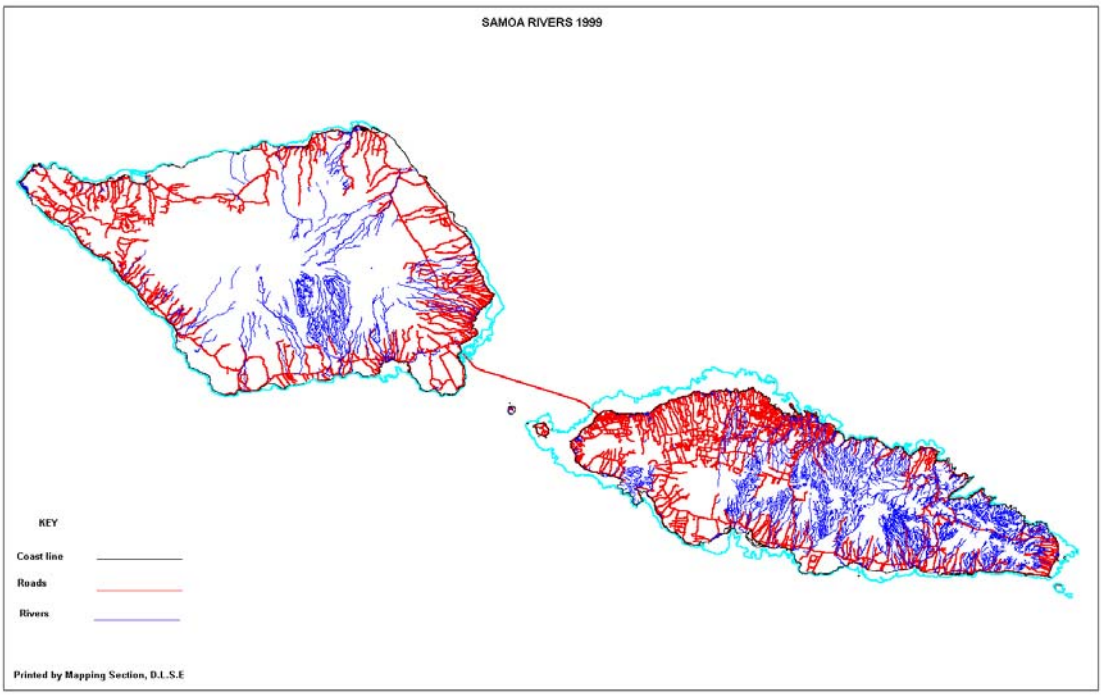
The smallholder livestock subsector has traditionally concentrated on pigs and poultry. Cattle were mainly in the state-owned, WSTEC (Western Samoa Trust Estate Corporation) dominated, plantation sector. The historical role for cattle was to act as sweepers for weed control in coconut plantations rather than as a primary source of income. This has affected attitudes to cattle herd management. Most of the large WSTEC plantations have now been split up and leased to private farmers. Today the strength and growth in the cattle industry is in the emerging commercial smallholder sector, looking to diversify production, particularly since the taro leaf blight, and to increase income in an increasingly cash dominated economy.

In 1995, the cattle population was split among sectors in the proportions with government (3%), WSTEC (12%), NGOs (17%), and private (68%) (Lee 2001). Most pastoral production occurs in mature coconut plantations. This silvo-pastoral system has evolved as farmers, researchers and extensionists have realized that the wide spacing between coconut palms and their great height leaves considerable space and ample light in which to intercrop, and thereby increase income from the same land area. This partly compensates for the volatile nature of returns from copra.

2.3.6 Deforestation

Deforestation is the most pressing issue as most regard it as the greatest threat to terrestrial and marine resources as well as foremost in the spectra of land transformation. The issue of deforestation covers a wide area of concern from land clearance for subsistence and commercial agriculture, commercial logging, pasture and settlement areas.

Figure 5: Roads/Route tracks of Samoa



The rate of forest clearance for agricultural purposes and infrastructural development is alarming, with an estimated 4,000ha per year of forests having been cleared, primarily for agriculture. On a global scale, this is a dramatic rate of rainforest clearance. For Samoa, this loss of indigenous forest is a tragedy, representing the loss not only of natural resource ecosystems, endemic species, plants and animals that are not found elsewhere, but also a dramatic loss of water catchment areas, forests that maintain soil stability and long term sources of food, cultural material and timber products from the forest ecosystem. On the economic front, positive linear trends with the country's economy

have over the years been a result of agricultural and timber exports. Today despite the shift of economic focus to other significant sectors of the government such as Tourism and Fisheries and, the Construction industry, agriculture still form the main socio-economic mainstay of village communities and families.

An obvious indication of land deterioration is the massive deposition of soil sedimentation washed into the coastal area as a result of increased land clearance. This is mainly due to Samoa's fragile soil structure. This problem is especially apparent during rainy season from rivers and streams flowing into the sea. Inland soils also suffer from an increasing depletion of nutrients and other forms of degradation due to overuse of available land and insufficient land conservation and management practices.

2.3.7 Coastal exploitation

Another identifiable problem is the level of mining activities such as the removal of sand and gravel because of the rise in demand from the construction industry, individual and communal development. Demand is outstripping traditional supplies in places and causing significant environmental damage and land loss from erosion. The extraction of sand is a significant factor contributing to land degradation in terms of its effect on those communities who have settled along the coastal areas. In addition to this is the loss of marine and coastal biodiversity.

2.3.8 Climate change

Samoa is among the most vulnerable countries to the impacts of climate change and sea level rise. Samoa is vulnerable to anomalously long dry spells that coincide with the El Nino Southern Oscillation (ENSO) phenomena, high temperatures and changes in precipitation patterns. 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).

The Vulnerability and Adaptation assessment study shows that about 70% of Samoa's population and infrastructure are located in the low lying coastal zone. The mapping of areas vulnerable to natural hazards under the World Bank funded project also indicated that 65% of all stations assessed for sensitivity to coastal hazards were highly vulnerable to flooding and erosion, 20% medium and 11% being highly sensitive, and only 4% of the coastline is resilient to coastal hazards which are climate related (WSSD, Government of Samoa, 2002).

Land will face many challenges over the coming decades. Degrading soils and water resources will place enormous strains on achieving food security for growing populations. These conditions may be worsened by climate change. Besides human life and health, the areas regarded to have the highest vulnerabilities to climate change and sea level rise impacts are the coastal zone, water, agriculture and bio-diversity. (Government of Samoa, National Communication, 1999)

Samoa has taken national actions to address and support implementation of related climate change projects to enhance the capacity and awareness to climate change issues. As a, least developed country (LDC) party to the UNFCCC, Samoa will be engage in the

preparation of National Adaptation Program of Action. One of the guiding principles for this NAPA process centered on identification of vulnerabilities and urgent needs, which start with a consultative process performed at the community level, involving all stakeholders, land users, and in so doing, encompass indigenous knowledge and local technologies available for coping with the adverse effects of climate change. This will strengthen the existing climate change implementation mechanism for Samoa, as Samoa is vulnerable to floods, water scarcity, and drought and forest fire associated with climate extremes.

Greenhouse Gas Inventory shows relatively low and insignificant emissions compare to world standards. It is ethical; therefore, that Samoa should recognise its obligation toward reducing GHG emissions. Landuse Change and Forestry was identified as a major sink for carbon in 1994 (Government of Samoa, National Communication 1999) This is an evidence that CO_2 alone can be controlled manually, either by allowing more lands, to be converted back to forest, or by improving landuse techniques or slowing down the rate of deforestation or a combination of these. (Ibid) Consequently combating land degradation is equally having an impact on mitigating climate change. Similarly, action to address land degradation will contributes to advancing the adaptive capacity of Samoa to climate change and sea level rise. It is important that adaptation measures for climate change are identified and harmonised with the CCD implementation process.

3. EXISTING RESPONSES / ACTIONS THAT INDIRECTLY ADDRESS LAND DEGRADATION PROBLEMS IN SAMOA

The Government of Samoa (GoS) has long recognized the need for sustainable development in light of progress through economic growth, and improvement in infrastructural developments, which can have adverse impact on Samoa's natural resources for both terrestrial and marine resources. Samoa prior to its ratification of the United Nations Convention to Combat Desertification (UNCCD) in 1998, have already put in place mechanisms to address issues concerning the sustainable management of its environmental resources; through the establishment of the Division of Environment and Conservation (DEC) under the Department of Lands, Surveys and Environment (DLSE), community conservation programmes, institutional strengthening programmes and capacity building programmes in the form of public awareness, training and information dissemination. Thus, all of which indirectly deal with the pressing issue of land degradation in Samoa.

3.1 Establishment of DEC under the Department of Lands, Surveys and Environment 1989.

The setting up of DEC is a milestone development taken by GoS to highlight its commitment to the global goal of sustainable development. In Part 8 of the "*Lands and Environment Act 1989"* it defines the principal functions of DEC "…… ensure and promote the conservation and protection of the natural resources and environment of Western Samoa…." (Schuster, 2001). Also under the DLSE Act 1989, recommendations that were made to the Minister include; the establishment of national parks and reserves; carrying out investigations and research relevant to protection and conservation of natural

resources and the environment; and for the promotion of public awareness on the importance of the environment and its conservation.

3.2 Community Conservation Programmes through Environmental NGO's and GoS

In line with the government's move towards sustainable development of Samoa's natural resources, some village communities have shown support and interest in developing community based conservation areas. For this reason, these communities through assistance from international, regional and local Non-Government Environmental Organizations have established conservation areas to protect their rainforest resources — such as the Preservation of the Falealupo Lowland Ecosystem (Savaii Island) with funding assistance from Seacology Foundation — the Conservation of Tafua Peninsula Coastal Ecosystem (Savaii Island) with funding assistance from the Swedish Foundation for Nature Conservation and Faasao Savaii and O Le Siosiomaga Society Inc local NGO's providing an advisory and management support role. In addition the Uafato Conservation Area (Upolu Island) funded by the SPBCP (South Pacific Biodiversity Conservation Programme) with technical support from the O Le Siosiomaga Society Inc.

The mangrove conservation area in Saanapu - Sataoa funded by the SPBCP with DEC of DLSE providing technical assistance and an advisory role for the sustainable management of the site. This is the only community-conservation based programme, which DLSE as a government department provided direct technical assistance, whereas other community-based conservation areas DLSE offered an advisory role through the NGO's that are working with the communities. At present most of these community-based conservation areas have now been taken over by the communities in terms of implementing conservation programmes.

On going conservation programmes with village communities continues to be driven by local environment NGO's such as the O Le Siosiomaga Society Inc and METI (Matuaileoo) acting as advocacy of national environmental concerns.

3.3 Government of Samoa existing Institutional Strengthening Programmes

In its commitment to international and regional agreements, Samoa has over the years developed national strategies, policies and conducted institutional strengthening programmes within its line departments to reflect upon its goal of sustainable development.

3.3.1 National Environment and Sustainable Development Strategy (NEMS)

The publication of the National Environment and Sustainable Development Strategy (NEMS) in 1993 indicated the prioritising by government of environmental issues that were having profound impact on the natural environment and development progress. The NEMS identified 12 Target Environmental Components (TEC's), which required the formulation of policies and strategies to address each issue as follows; landuse, population and sustainable development, waste management, protection of freshwater, biodiversity, heritage, climate change, protection of the atmosphere (ozone), combating deforestation, development of human resources, protection of the sea and marine resources and promoting sustainable economic growth.

Since the development of NEMS, six TEC's have been approved as national policies for the better management of Samoa's environmental resources. These NEMS policies include; National Waste Management Policy, National Landuse Policy, National Water Resource Policy, Natural Heritage Conservation Policy and the National Forestry Policy. Each of these national policies include strategies in which the focal implementing agency DLSE and all relevant stakeholders both government departments, and the private sector can use as working documents to meet the objectives set out in the policies.

3.3.2 National Institutional Strengthening Programmes

A number of sound initiatives have been in place to facilitate the effective management and implementation of UNCCD at the community, national and regional level. These are made possible through existing government policies, technical assistance and Institutional Strengthening Programmes (ISP) under bi-lateral arrangements with international donors such as the World Bank and Asian Development Bank (ADB) etc. Some of these include;

I. **Good Governance:** The GOS has since the early nineties committed itself to the promotion of good governance. According to the World Summit for Sustainable Development Assessment Report for Samoa (WSSD Government of Samoa, 2002), there is now greater awareness of the importance of maintaining good governance in facilitating economic growth, in maintaining socio-political stability and reinforcing the confidence of the donor community in the effective management by Samoa of its aid resources.

II. **Public Sector Reforms:** The GoS continues 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 better delivered by the private sector. The main aim of these reforms is to raise the efficiency and effectiveness of the services provided by government departments and agencies (WSSD Government of Samoa, 2002).

III. **Strategy for the Development of Samoa (SDS):** In line with the Public Sector Reform, a national publication formerly known as the Statement of Economic Strategies, the SDS provides updated information outlining the government's current and proposed developments. This document emphasis the strong partnership in working commitments between the government, private sector, tertiary institutions, NGOs and village communities to improve the standard of living in Samoa and at the same time developments is built upon an awareness of a national concerted efforts for the sustainable management of Samoa's environmental resources.

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;

- Maintaining a stable macroeconomic framework
- Improve education standards

- Improve Private Sector Development and Employment Creation
- Enhance Agricultural Opportunities
- Strengthen Social Structure
- Improve Infrastructure and Services
- Improve Opportunities for Tourism Industry
- Enhance Public Sector Efficiency

The overall theme for the 2002-2004 SDS is "Opportunities for All" which strongly emphasize the need for every Samoan to enjoy the benefits of national developments (GoS Department of Treasury, 2002).

3.4 Regional and National Coordination

Samoa's relationship with its neighbouring Pacific Island Countries (PIC's) has foster a strong network in implementing environmental programmes as a response to current severe environmental concerns that has highly affected PIC's, such as climate change, waste management, loss of biodiversity, persistent organic pollutants, and limited freshwater resources. Many Small Island Developing States (SIDS) in the Pacific are currently addressing these environmental problems with financial assistance from international donors such as the Global Environment Facility (GEF) to its UNDP regional offices. Similarly the South Pacific Regional Environment Programme (SPREP) acts as a middle agency seeking financial and technical support for SIDS to further build their capacity to ensure that they are better equipped with skills that will enable them to respond and develop appropriate measures in mitigating or solving environmental problems within their respective countries. For example, of such Regional Coordination covers the Pacific Island Climate Change Assistance Programme (PICCAP), Pacific Information Environment Network (PEIN-SPREP), Regional Project in May 2000 focussed on hazardous wastes in a number of PIC's including Samoa, and a regional collective endeavour for all PIC's in the protection of natural resources and environment of the South Pacific Region.

Most of these regional programmes are currently in progress as response to environmental problems, however as noted from the main environmental issues highlighted none of which directly deals with the challenging issue of land degradation in Samoa.

At the national level, some coordinated effort between government departments; non-government organizations, private sector and other relevant stakeholders have been very active in promoting environmental awareness programmes. The establishment of the National Beautification Committee (NBC) 1997 under the Samoa Visitors Bureau Office is one indicator of inter-departmental networking with the private sector in monitoring and regulating a clean environment in work places and village areas (WSSD Government of Samoa, 2002). Comparably the setting up of Environment Projects Task Force Teams or National Coordinating Committees, spearheaded by DLSE includes the following; National Climate Change Country Team, International Waters Country Team, National Biodiversity Steering Committee, National Ozone Team, and the Persistent Organic Pollutants National Task Force Team. All these national task force

team are made up of various stakeholders from government departments, tertiary institutions, private sector and members of the civil community.

3.5 Institutional Strengthening within the Department of Lands, Surveys and Environment (DLSE)

DLSE being the leading national agency for Samoa in the implementation of most environmental programmes have undertaken a major institutional review to efficiently develop appropriate mechanisms that can be adopted in the sustainable management of the country's environmental and natural resources. In addition, DLSE is the focal clearinghouse for all national environment related information to the public and to regional and international organizations.

3.5.1 Land Management Division (LMD) of DLSE 2000

The establishment of the LMD saw the critical need to improve the status of landuse and sustainable management of Samoa's land resources, which are divided within four major groups of land ownership. The WSSD Government of Samoa report (2002) identify these land ownership in descending order; customary land 81%, government 11%, WESTEC / SLC 5% and Freehold land 3%. The Land Management Division currently deals with administering of land matters, which includes the registration, leasing, land policies and issuing sand mining licenses. In addition, the Land Board is a statutory executive decision making body for deciding matters pertaining to all landuse development issues in Samoa. The Land Board works in collaboration with the Land Management Division.

3.5.2 Infrastructural Asset Management Project (IAMP)

The Institutional Strengthening Review for DLSE conducted under the World Bank IAMP (2001) focussed on the implementation of Coastal Environmental and Institutional Services (CEIS). 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 (WSSD Government of Samoa, 2002). The IAMP directly addresses issues concerning Coastal Infrastructure Management Strategy (CIMS), Coastal Management Plan (CMP), Coastal Hazard Mapping and Natural Disaster Management Plan.

3.5.3 Planning and Urban Management Agency (PUMA) of DLSE 2002

The recent addition earlier this year of a new division housed under DLSE witness the further expansion of the department in its move towards the sustainable management of Samoa's environment and natural resources. The key responsibilities of PUMA are to provide plans and policy services for land use and to establish and operate a regulation framework for planning assessment and building control (Environment Forum DLSE, 2001).

3.5.4 DLSE Corporate Plan 2000-2002

The current Corporate Plan sets out strategies to achieve the department's stated objectives and mission "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). Also, in recognition of DLSE being the stewardship for sustainable development and management of Samoa's environment, several proposal

have suggested the renaming of the department as the Ministry of Environment and Natural Resources, to encompass all environmentally related issues (WSSD Government of Samoa, 2002).

4. THE STRATEGIES AND PRIORITIES ESTABLISHED WITHIN THE FRAMEWORK OF SUSTAINABLE DEVELOPMENT PLANS AND/OR POLICIES, TO COMBAT LAND DEGRADATION AND MITIGATE THE EFFECTS OF DROUGHTS.

Implementation of development in the Samoan context will have to be strategically based if the outcomes are to be economically, socio-culturally and ecologically sustainable. A number of international and regional environment conventions, national policies and strategies have already existed whilst others are currently in the process of completion and approval by government. These working documents were developed through an integrated approach whereby economic, socio-cultural and ecological factors were taken into account with regards to sustainable developments that will ensure all stakeholders from government, business community and the local community at the grass root level at large plays a role in the implementation of environment programmes. Importantly this integrated approach can built upon Samoa's civil society becoming responsible citizens in working towards mitigating environmental problems that may have adverse impacts on Samoa's environment and natural resources. Henceforth the GoS being party to a number of international and regional conventions, has shown its conviction in support of environment programmes as indicated by existing legislations, policies, and strategies at the national level in Table 4.1, Table 4.2 and Table 4.3 below.

ACTIONS WITHIN THE FRAMEWORK OF SUSTAINABLE DEVELOPMENT PLANS

Table 4.1 International and Regional Conventions Samoa is a Party too / Multi-lateral Environment Agreements

International Conventions	Year	Status	Responsible National Agency
United Nations Framework on the Convention on Climate Change (UNFCCC)	Dec 29, 1994	Ratified	MFA (Ministry of Foreign Affairs) – political focal point DLSE – implementing focal point
Convention on Biological Diversity (CBD)	Feb 10, 1994	Ratified	MFA – political focal point DLSE – implementing focal point
Convention for the Protection of the Ozone Layer	Dec 21, 1992	Ratified	MFA – political focal point DLSE – implementing focal point
Montreal Protocol on Substances that deplete the Ozone Layer	Dec 21,1992	Ratified	MFA – political focal point DLSE- implementing focal point
United Nations Convention to Combat Desertification	Aug 21,1998	Acceded	MFA – political focal point DLSE- implementing focal point
Cartagena Protocol on Biosafety	Mar 13, 2002	Ratified	MFA- political focal point DLSE- implementing agency
Kyoto Protocol to the Framework Convention	Nov 15,2000	Ratified	MFA- political focal point DLSE- implementing focal point

Stockholm Convention on Persistent Organic and Pollutants	Feb 4, 2002	Ratified	MFA- political focal point DLSE- implementing focal point
Convention concerning the Protection of the World Cultural and Natural Heritage	Aug 27,2001	Acceded	MFA- political focal point DLSE – implementing focal point
Basel Convention	Mar 22, 2002	Acceded	MFA-political focal point DLSE- implementing focal point
Convention on the Conservation of Nature in the South Pacific	July 20,1990	Ratified	MFA- political focal DLSE – implementing focal point
Convention for the Protection of Natural Resources and Environment of the South Pacific	July 23,1990	Ratified	MFA- political focal point DLSE- implementing focal point
Waigani Convention	May 16,2001	Ratified	MFA- political focal point DLSE- implementing focal point

Table 4.2 Relevant National Legislations to the Implementation of UNCCD in Samoa

Legislations	**Scope of Act**	**Responsible Agencies**
Lands and Environment Act 1989	To ensure and promote the conservation and protection of the natural resources and environment of Samoa	DLSE / DEC
National Parks Act 1974	To established and managed protected areas in Samoa	DLSE / DEC
Plants Act 1984	To regulate the export of plant materials from Samoa	Ministry Agriculture, Fisheries, Forestry and Meteorology (MAFFM)
Forest Act 1967	To manage and sustainably use the forest of Samoa	MAFFM – Forestry Division
Watershed Management Regulations	To protect and manage the five identified water catchment areas in Samoa	MAFFM – Forestry Division
Village Fono Act 1989	Recognise the traditional management systems for the control of village resources and village management	Ministry of Internal Affairs
Water Act 1965	To manage water resources	Water Authority Corporation
Alienation of Customary Lands Act 1965	To provide for the leasing and licensing of customary land for certain purposes	DLSE / LMD (Land Management Division)
Taking of Land Act 1964	Provides for the taking of land for public purposes (customary and freehold land)	DLSE / LMD
Alienation of Freehold Land Act 1972	To control the alienation of freehold land to persons who are not resident citizen and to overseas corporation	DLSE / LMD
	EXISTING CODES OF ENVIRONMENT PRACTICE	
Codes of Logging Practice	Appropriate methods of logging with less impact on forest resources	MAFFM – Forestry Division

Codes of Environmental Ethics	Appropriate methods of addressing environment issues in line with traditional and cultural ethics	DLSE and all relevant stakeholders
	PROPOSED REGULATIONS	
Environment Bill	Framework Act for the management of Samoa's environment and biological diversity	DLSE / DEC
Environment Bio- Prospecting Regulation 1999	To regulate access to Samoa's genetic resources and the equitable sharing of benefits derived from its users	DLSE / DEC
Environment Impact Assessment Regulation 1998	To regulate and guide impact assessments in Samoa for both private and public development proposals	DLSE / PUMA

Table 4.3 Relevant National Strategies and Policies to the Implementation of UNCCD in Samoa

Related Policy and Strategies	**Scope**	**Responsible Agencies**
NEMS Approved Policies		
❖ National Waste Management Policy	To control and manage waste and pollution	DLSE
❖ National Landuse Policy	To protect and promote sustainable utilisation of Samoa's land resources	DLSE
❖ National Water Resource Policy	Provides a framework for the conservation, sustainable use and management of Samoa's water resources	DLSE / Samoa Water Authority Corporation
❖ National Policy on Population and Sustainable Development Policy	NPPSD prioritise the integration of population issues into development planning and assessment.	DLSE / Health Department
❖ National Forest Policy	To manage and promote replanting of indigenous forest trees and rehabilitating forestland cleared for logging.	DLSE / MAFFM
❖ Natural Heritage Conservation Policy	To preserve existing natural heritage sites in Samoa	DLSE
Coastal Infrastructure Management Strategy (CIMS)	Sets the scene for promoting better management of coastal infrastructure.	DLSE
National Biodiversity Action Plan	Framework to meet obligations under the Convention on Biological Diversity	DLSE / DEC
Landfill Strategy for Tafaigata Landfill site	Provides a framework to improve and sustainably manage the Tafaigata landfill	DLSE / PUMA
Strategic Action Programme for International Waters 2000-2005	Focus on the protection of fresh water resources in Samoa	DLSE / DEC
Sand Mining Policy	Sustainable management of coastal land resources	DLSE / LMD

Land Lease Policy	The allocation of land under government land ownership to applicants wishing to lease government land for use.	DLSE / LMD
Land Reclamation Policy	Provides procedures for the administration of land reclamation.	DLSE / LMD
Land Policy for the leasing of government land to government departments and non-government organisations	This Policy states procedures for leasing government land to government departments and non-government organizations	DLSE / LMD

4.4 Institutional measures taken to Implement the UNCCD

A National Task Force Team has already being formalized under the first national stakeholder consultation workshop in preparation for this National Report on the 10 October 2002. These stakeholders include;

- Ministry of Internal Affairs
- Ministry of Agriculture, Forestry, Fisheries and Meteorology
- Office of the Attorney General
- Department of Treasury
- Department of Trades, Commerce and Industries
- Ministry of Foreign Affairs
- Electric Power Corporation
- Samoa Water Authority
- Ministry of Women's Affair
- Health Department
- Samoa Visitors Bureau

Non-Government Organizations

- Samoa Umbrella for Non-Government Organizations
- O Le Siosiomaga Society
- National Council of Churches
- National Council of Women
- Samoa Farmers Association

Tertiary Institutions

- National University of Samoa

The main implementing agency spearheading the coordination of activities of UNCCD in Samoa is the Department of Lands, Surveys and Environment.

5. Constraining factors that hinders the implementation of UNCCD in Samoa

The ratification of the United Nation Convention to Combat Dessertification (UNCCD) in Samoa as an affected country Parties of regions in 1998, identify "land degradation" as the main environmental concern which needs immediate resolution to address the country's rising problems directly related to land deterioration. For example these problems include; unsustainable landuse, population pressure, natural hazards, lack of availability of relevant information, limited capacity building within the country to provide awareness programmes and training workshops, limited technology and technical

experts, and limited financial resources to implement appropriate approaches or activities to mitigate land degradation problems in Samoa.

5.5.1 Unsustainable Landuse

In their paper on Tackling Land Degradation and Unsustainable Land Use in Samoa - with Emphasis on the Agriculture Sector by Tuivalagi, Hunter and Amosa (2001) they pointed out the following causes of direct land deterioration in Samoa as related to; over cutting of ground cover vegetation, shifting cultivation without adequate fallow periods, overgrazing, non-adoption of soil-conservation management practices, extension of cultivation onto lands of lower potential and/ or high natural hazards, improper crop rotation, unbalanced fertilizers and over pumping of ground water. These obvious indicators of land degradation problems in Samoa is seen in the high level of soil erosion, poor yield of the country's crop production, which is a major economic set back to Samoa's agricultural sector as it was one of the main contributors to the country's national economy (GoS Department of Treasury, 2002).

5.5.2 Population Pressure

The unsustainable landuse practises as mentioned above is another related cause of the high level of internal migration of young people from the rural areas to look for employment opportunities in the urban area or Apia (the capital city). This influx of people into the urban area has severe impacts upon the limited land resources within the urban area for settlements and at the same time accommodate the growing number of manufacturing industries and small businesses. An indication of population pressure on land resources within Apia urban area is seen in the number of land reclamation of swamps or areas previously covered with mangroves being reclaimed for settlements or to set up businesses. The rise in land reclamation is a contributing factor in further aggravating land degradation issue in Samoa, with regards to the loss of biodiversity, increase in health problems such as poor sanitations, noise pollution and poverty.

5.5.3 Natural Hazards

Apart from human induced activities, which have significant adverse impacts on land resources, natural degradation hazards can also alter the condition of land use patterns. In Samoa, tropical cyclones have been a frequent occurrence in previous years such as cyclone Ofa (1990) and Val (1991). Both cyclones had a devastating effect on the land resources of Samoa, in terms of large tracts of land clearance on upland and lowland coastal areas. This level of land clearance contributed very much to extreme soil erosion during rainy seasons.

Another natural hazard experience in Samoa is the long period of droughts. Samoa is vulnerable to anomalously long dry spells that coincide with the El Nino southern Oscillation (ENSO) phenomena. These vulnerabilities are particularly exacerbated during extreme events, as evident after tropical cyclones Ofa (1990) and Val (1991) whereby dry spells immediately followed (Government of Samoa DLSE 1999). Volcanic activity in Samoa is dormant.

5.5.4 Limited Relevant Information

In order to facilitate and implement measures that are needed to address land degradation issues in Samoa, relevant information from previous studies conducted in-country is required. Also, information on success stories in other SIDS with similar problems to Samoa on land degradation are vital as guides to good practise that Samoa may look into adapting, when implementing activities under UNCCD.

5.5.5 Limited Capacity Building

This needs greater attention in terms of public awareness programmes to highlight the importance of land degradation issues, and the need for a national collaboration between relevant stakeholders from the government, private sector, tertiary institutions and local communities to work together. As well, areas with severe land deterioration problems should be seen as priority areas, and thus local training workshops for affected communities is an important tool to kick start community participation.

Further capacity is needed to implement the convention and to rehabilitate the degraded environment. There is a lack of national and local capacity to understand and implement UNCCD. Public awareness is needed to understand the impacts of land degradation and to identify adaptive mechanisms to cope with the issue.

5.5.6 Limited Technology and Technical Expertise

In order to address issues pertaining to land degradation in Samoa it is important to have a technical personnel with land resource management skills in field research work, to conduct an assessment or inventory of highly degraded land areas in Samoa. Although there are a number of villages with land deterioration problems identifying and prioritising areas that needs immediate attention requires a technical expert to carry out research scientific research. Thus, prioritising the areas with the most pressing land degradation problems should also require necessary technology that are appropriate in addressing the main issues that may affect such areas, such as soil erosion problems, dry infertile land and fallow land which needs rehabilitation.

5.5.7 Financial Constraints

This is a key constraint that can set back any developments made to combat land degradation in Samoa. The need for financial support and funding is very important in the implementation of all the constraints listed above, because without financial support all efforts and working collaboration between relevant parties at the national level may not eventuate. Hence, in Samoa people are aware of environmental issues or concern, but funding assistance can be a limiting factor in putting together activities that can provide a sound approach in responding to environmental problems.

6. Recommended Measures

Despite all existing sustainable environment programmes, international and regional conventions, national legislations, strategies and policies that indirectly address the issues of land degradation in Samoa under the UNCCD, there is still a wide area of uncertainty in direct measures that are required to effectively implement the convention. In light of this situation, the following recommendations are necessary appropriate mechanisms that

can further strengthen the implementation of activities under the UNCCD work programme for Samoa.

6.1 Institutional Arrangements

- Adopt similar linkages and synergies with existing international and regional organizations Samoa is Party too, such as UNFCCC and CBD
- Implement relevant existing national policies, which deals directly with issues of land degradation in Samoa.
- Set criteria to assess and prioritize areas under land degradation within the contextual framework highlighted under the UNCCD
- Recruit a technical expert or consultant with scientific background to conduct research or a national inventory of all degraded land in Samoa, so that the highly affected areas can be identify as priority areas for the project.
- Develop capacity building programmes in terms of training workshops for local communities in highly affected or degraded land areas.
- Develop public awareness programmes for all relevant stakeholders to facilitate an understanding of the status and implications as a consequence of land degradation in Samoa.
- Review existing legislations (Lands and Environment Act 1989) to incorporate specific provisions pertaining to land degradation matters.
- Adopt an integrated approach involving all key government departments, private sector, NGOs and local communities in the sustainable co-management of land resources

6.2 Develop appropriate landuse measures

- Re-activate the development and practice of agroforestry systems
- Monitor and control the over use of toxic chemicals used in fertilizers
- Adopt soil conservation management practices
- Discourage destructive traditional farming methods such as shifting cultivation without fallow periods, and slash and burn land clearance for agricultural farming.
- Regulate the use of land resources with strong emphasis on the conservation of marginal land areas (upland / mountains)
- Enforce existing policies with regards to the removal or extraction of lowland coastal resources (silt, sand, gravel, boulders and coral).

6.3 Set up an Information Management Sharing Network

- Improve information sharing on the international and regional level through effective networking.
- Develop a national database on landuse patterns and land information that can be accessible to the public
- Compile and digitize land use information through the use of GIS (Geographic Information System) to provide updated and accurate information on land use changes in Samoa.

6.4 Application of Appropriate Technology

- Samoa needs to identify sound technology that can be use to combat the problem of land degradation
- Transfer of appropriate technology applied in other countries with similar problems in land degradation to Samoa is a cost-effective means of mitigations.

6.5 Financial Support

- There is an extreme requirement for financial support in facilitating the implementation of activities under UNCCD in Samoa.
- Identifying and exploring sources of funding at all levels is important in meeting Samoa's obligations under the UNCCD.
- Samoa due to its limited financial resources is committed in providing human resources and other supporting tasks that can enable the effective implementation of the convention.

7. Benchmarks and Indicators

7.1 Benchmarks and indicators are yet to be identified by the National Task Force Team.

REFERENCES

1. ADP, 2001**,** *Samoa 2001-2003 Country Assistance Plan- Samoa***,** ADB.Org

2. Clarke, W.C. M, Thamn. R. R., 1999, *Agricultural and Forestry in: The Pacific Islands Environment and Society*, Bess Press, Honolulu Islands, USA

3. Chase, R and Veitayaki, J, 1992, *Implications of Climatic Change and Sea Level Rise for Western Samoa: Report of a Preparatory Mission*, South Pacific Regional Environmental Programme, SPREP Reports and Studies Series No. 59, Apia, Samoa

4. FAO, 1998, *Land resources in Small-Island developing State*, UNEP Island Website

5. GEF, 1998, *Report of the STAP Expert Group Workshop on Land Degradation*, Bologna, Italy

6. Government of Samoa Department of Lands, Surveys and Environment, 2001, *National Biodiversity Strategy and Action Plan*, DLSE, Apia, Samoa

7. Government of Samoa Department of Lands, Surveys and Environment, 2001, *National Water Resources Policy*, DLSE, Apia, Samoa

8. Government of Samoa Department of Lands, Surveys and Environment, 2001, *National Waste Management Policy*, DLSE, Apia, Samoa

9. Government of Samoa Department of Lands, Surveys and Environment, 2001, *National Land-use Policy*, DLSE, Apia, Samoa

10. Government of Samoa Department of Lands, Surveys and Environment, 2001, *National Policy on Population and Sustainable Development*, DLSE, Apia, Samoa

11. Government of Samoa Department of Statistics, 2000, *Agriculture Survey*, DS, Apia, Samoa

12. Government of Samoa Department of Statistics, 2001, *Census of Population and Housing*, *A special release of census selected tabulations*, DS, Apia, Samoa

13. Government of Samoa Treasury Department, 2002, *Strategy for the Development of Samoa 2002 – 2004*, Treasury Department, Apia, Samoa

14. Government of Samoa, 2000, *Samoa's First National Report to Convention on Biological Diversity*, Apia, Samoa

15. Government of Samoa, 2002, *World Summit on Sustainable Development Assessment Report*, Apia, Samoa

16. International Forest Environment Research and Management, 1991, *Western Samoa Ecological Survey and Resource Conservation Review (W.S.E.S)*, Apia, Samoa

17. Reti, M. I, 1991, *Division of Environment and Conservation-National report*, DLSE, Apia, Samoa

18. Stednick, J. D., 1990, *Water Quantity and Quality Monitoring Programs for the Vaisigano Catchment in Particular, and Western Samoa in general*, Food and Agriculture Organisation, Field Document No. 3

19. Suluvale, E. T., 1997, *The Role of Contaminants in Altering the Coastal Environment of Samoa: Thesis*, University of Adelaide, Australia

20. Taulealo, T. I, 1993, *National Environment Sustainable Development Management Strategy*, DLSE, Apia, Samoa

21. Tuivavalagi, M., Hunter, D., Amosa, F., 2001, *Tackling Land Degradation and Unsustainable Land use in Samoa- with emphasis in the Agriculture Sector,* University of the South Pacific, Alafua Campus, Samoa

22. Urban Planning and Management Project Team, 2001, *Integrated Urban Management Planning Project*, Apia, Samoa

23. Vaai K & Associates, 1997, *Samoa: Strategy for Growth and Diversity and Diversification of the Agriculture Sector 1997 – 2000*, Apia, Samoa

24. Vermullen, W., 2000, *A rapid Assessment of Land Degradation in Samoa-Capacity Development Initiative*, Apia, Samoa