

# SAMOA'S BIODIVERSITY STRATEGY AND ACTION PLAN

*'Keep the Remainder  
of the Basket'*



# **SAMOA'S BIODIVERSITY STRATEGY & ACTION PLAN**

## *'Keep the Remainder of the Basket'*

Prepared by a Steering Committee composed of representatives of Government and Non-Governmental Organizations.

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**Funded under:**

**GEF/UNDP - ENABLING ACTIVITIES: THE CONVENTION ON BIOLOGICAL DIVERSITY**



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## FOREWORD



Honourable Tuala Sale Tagaloa  
Minister of Lands Surveys & Environment

*It gives me great pleasure on behalf of the Government of Samoa to endorse this Strategy and Action Plan for the conservation and sustainable development of our country's biological resources.*

*Samoa has a remarkable record in the conservation and preservation of environmental resources in its islands. It is the first among small island nations to establish systems of state owned national parks, reserves and conservation areas managed by village communities.*

*It is also one of the leading nations which established conventions and treaties for the protection of vast Pacific environments, such as treaties for the establishment of the South Pacific Regional Environment Programme and the conservation of nature in the Pacific; the Convention on Biological Diversity and other international arrangements for the preservation of our planet's fragile environment.*

*In spite of all these, we still have much more to do. A host of global challenges and consequences of our own individual actions are threatening the survival of the remaining natural endowments of our islands. We must guide our development towards a sustainable future.*

*Moreover, we can not return to the lifestyles our ancestors had through thousands of years that was close in harmony with the ecological needs of these islands. Social and economic development in the world is advancing at unprecedented levels and we are a part of it.*

*However, we can and we are at a critical juncture in history to make a choice to courageously and consciously re-examine our actions and transform them into means that will in the long run enhance our islands and the planet's environment. The making of such a wise choice will have to involve everyone and will have to appreciate everyone's contributions.*

*Therefore, as we begin this new millenium of caring for the multitudinous needs of our nation and peoples it is timely to lay out this plan as an important part of our continuing efforts to chart an environmentally sound and socially just direction of development.*

*Your Government is very happy to present this plan of actions to you, in the hope that the key to its success is in the hands of the each and every Samoan.*

*This is our choice to ensure that our children will inherit from us islands rich with the diversity of nature's gifts and a just system of stewardship for biological resources.*

*Warmest greetings,*

*Tuala Sale Tagaloa  
Minister of Lands, Surveys & Environment*

## EXECUTIVE SUMMARY

Samoa's Biodiversity Strategy and Action Plan is an integral component of its National Environment and Development Management Strategies – its response to the world wide call from the Earth Summit of 1992 for nations to re-examine their developments and make changes that are necessary to turn the tide of environmental degradation and the need for a direction of sustainability in human development.

The Strategy outlines the state of Samoa's biological resources and actions to curb their degradation and achieve their sustainable development. It is the country's foremost expression of commitment to the Convention on Biological Diversity which it has ratified on the eve of the Convention's accession.

This work was formulated through a multi-sectoral consultative process involving representatives of various in-country governmental and non-governmental organisations as well as national and international experts. In particular, advisory services were given by representatives of mainly three inter-governmental organisations in the Pacific: the World Wildlife Fund For Nature Conservation, South Pacific Regional Environment Programme and United Nations Development Programme (Apia Office).

From the collection of a broad range of information and views, the stakeholders have extended the exercise to the allocation of responsibilities and assignments to groups of organisations. These groups have achieved so far the compilation of currently available base line information which have provided a fairly comprehensive background to the Strategy and have participated in the first training workshop on Economic Valuation of Natural Resources for implementing the Strategy.






Funding for the work has been generously provided by the United Nations Development Programme as the Implementing Agency for the Global Environment Facility - Enabling Activities. Leading this important project is the Division of Environment and Conservation of the Department of Lands, Surveys and Environment with the continuous and endless support by the NBSAP Steering Committee and its Technical Committees.



*Togitogiga Falls:Pupu Pu'e National Parks*

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## LIST OF ACRONYMS

AG	-	Attorney General
CUS	-	Customs
COP	-	Conference of the Parties to the Convention on Biological Diversity
DBS	-	Development Bank of Samoa
DJ	-	Department of Justice
DLSE	-	Department of Lands, Surveys & Environment
DPP	-	Department of Police & Prisons
DTCI	-	Department of Trade, Commerce & Industry
ED	-	Education Department
EPC	-	Electric Power Cooperation
FRMS	-	Finance Resource Management Service
FS	-	Faasao Savaii
GEF	-	Global Environment Facility
GIS	-	Geographic Information Systems
GOs	-	Governmental Organisations
HD	-	Health Department
IRD	-	Inland Revenue Department
IUCN	-	International Union for the Conservation of Nature (World Conservation Union)
MAFFM	-	Ministry of Agriculture, Forests, Fisheries & Meteorology
MFA	-	Ministry of Foreign Affairs
MIA	-	Ministry of Internal Affairs
MOT	-	Ministry of Transport
MWA	-	Ministry of Womens Affairs
MYSCA	-	Ministry of Youth, Sports and Cultural Affairs
NBSAPS	-	National Biodiversity Strategy and Action Plan of Samoa
NCW	-	National Council of Womens
NEMS	-	National Environment and Development Management Strategy
NGOs	-	Non-governmental Organisations
NUS	-	National University of Samoa
OLSS	-	O le Siosiomaga Society
PCB	-	Pacific Commercial Bank
PMD	-	Prime Ministers Department
PSC	-	Public Service Commission
PWD	-	Public Works Department
SBEC	-	Small Business Enterprises Cooperation
SMA	-	Samoa Museum Authority
SLC	-	Samoa Lands Cooperation
SOE	-	State of Environment Report
SPREP	-	South Pacific Regional Environment Programme
SPRIG	-	South Pacific Regional Initiative on Forests Genetic Resources
SSC	-	Samoa Shipping Cooperation
SUNGO	-	Samoa Umbrella of Non-governmental Organisations
SVB	-	Samoa Visitors Bureau
SWA	-	Samoa Water Authority
SWDCO	-	Samoa Womens Development Committees Organisation
TSA	-	Taulasea Samoa
TSY	-	Treasury Department
TVS	-	Televise Samoa
UNDP	-	United Nations Development Project
UNEP	-	United Nations Environment Project
USPA	-	University of the South Pacific at Alafua
VC	-	Village Communities
WIB	-	Women in Business
YMCA	-	Young Mens Christian Association





# **1. INTRODUCTION**

Biodiversity is most easily defined as ‘the variety of living things on earth’. It thus includes all the species that make up the natural world of Samoa, those, which naturally occur on the islands, and those brought here by people. Samoa’s isolation as islands from other land masses means that many of the species found here occur nowhere else in the world, i.e. are ‘endemic’, and their conservation is of particular importance. The strategy aims to conserve and sustainably use these endemic species and equally to secure the future of those species, native or introduced, that are vital to agriculture, forestry and fisheries. Thus, the conservation of biodiversity is vital to the ongoing social, economic and cultural development of the nation.

## **1.1 IMPORTANCE OF SAMOA’S BIODIVERSITY STRATEGY:**

Samoa’s natural heritage has maintained and improved both the social and economic well being of its people through generations. Biodiversity is present in all facets of Samoan life, from providing the natural resources needed for food and shelter, to providing medicinal plants to care for the health of the nation, and more importantly the Fa’a Samoa. Over generations this partnership was formed on trust that Samoans used the resources in a sustainable manner with appropriate measures of management, integrated into the village councils, for protecting the biodiversity.

Nevertheless, as changes takes place from a traditional subsistence economy to a commercial economy and from village-based management to national government management, the culture of care Samoans once had for their natural heritage is rapidly eroding away. Coupled with the increase in the country’s population and its needs they are imposing greater demands on fragile environment with limited available biological resources.

Furthermore, the impacts on small island developing states such as Samoa from global environmental crises such as global warming with its devastating consequences of frequent and severe cyclones, droughts and forest fires, makes the protection of island biological resources an issue which involves everyone and whole communities at all levels.

To provide an amicable solution to the new problems facing Samoa’s biodiversity, a merging of new approaches with traditional approaches are needed along with the cooperation and collaboration on a national and international scale.

## **1.2 CONTEXT OF THE STRATEGY:**

The participation of Samoa in global conferences on climate change, the Earth Summit on Environment and Development in 1992, and other successive global undertakings, and its impressive experience with the physical and mental impact of global environmental crises have all contributed in one way or another to the onset of a series of multi-sectoral consultation and public education and awareness raising activities to both raise the concerns for environment on the level of principle and to formulate direction and system of action to enable the country to cope with significant modern challenges. Foremost among these holistic approaches was the inter-departmental exercise that have formulated the country’s National Environment and Development Management Strategies the NEMS in 1993. One of the NEMS target component is the development of policies, strategies and actions to sustainably manage the country’s biological resources. Other development issues in which policy and strategy





formulation have been started either directly or indirectly related to the NEMS process includes: forest, population, waste, water, land use, economic development, finances, youth and women. A draft policy on biodiversity was also formulated. All these exercises have started in earnest within the last decade of the twentieth century and have various levels of environmental considerations incorporated in their respective results.

Prior to and during this experience, several activities which are both directly and indirectly related to biodiversity conservation have taken place and some have continued since then: the establishment of National Parks and Reserves and the reforestation programme which started in the early seventies; the establishment of a watershed management system; the conduct of species and ecological surveys; the publication of several research results and articles on the nature and status of components of Samoa's biodiversity; the ratification of several South Pacific treaties and conventions related to environment and environment conservation; and the establishment of various systems of community conservation areas throughout the country.

With this extensive store of information and wealth of experience, Samoa stands in a highly credible position to immediately ratify the CBD and carry out the formulation of this Strategy and Action Plan.

### **1.3 CONVENTION ON BIOLOGICAL DIVERSITY:**

The United Nations Environment Programme (UNEP) Convention on Biological Diversity was adopted at the Earth Summit in Rio de Janeiro in 1992. Samoa ratified the Convention in April 1993 and it came into force in December of that year. The provisions of the Convention are set out as 42 Articles. Article 1 identifies three objectives:

1. The conservation of biological diversity
2. The sustainable use of its components
3. The fair and equitable sharing of benefits arising out of the utilisation of genetic resources

Article 6 includes a requirement for each Contracting Party, 'in accordance with its particular conditions and capabilities, to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity...' This strategy represents Samoa's initial step to meet this obligation. The Strategy contains elements which also address in part the following further articles:

Article 7: Identification and Monitoring

Article 8: In situ Conservation

Article 9: Ex-situ Conservation

Article 10: Sustainable Use of Components of Biological Diversity

Article 11: Incentive Measures

Article 12: Research and Training

Article 13: Public Education and Awareness

Article 14: Impact Assessment and Minimising Adverse Impacts

Article 15: Access to Genetic Resources

Article 16: Access to Transfer of Technology

Article 17: Exchange of Information

Article 18: Technical and Scientific Cooperation

Article 19: Handling of Biotechnology and Distribution of its Benefits

Article 20: Financial Resources

Article 21: Financial Mechanisms

Article 22: International Relationships

Appendix 5.2 contains an analysis of where Samoa is currently placed against each of those articles.



## 1.4 PROCESS OF STRATEGY FORMULATION:

### 1.4.1 PROCESS, STRUCTURE, TIMETABLE & PARTICIPANTS:

The NBSAP was formulated in a two year project (March 1999 – February 2000) which composed of an extensive process of research and consultative activities involving a broad range of stakeholders at all levels. The project was funded under the GEF's Enabling Activities that are administered by the UNDP.

The DEC of DLSE as the lead agency, appointed its Chief Biodiversity Officer as Project Manager and housed a National Project Coordinator that was contracted through the NGO, O Le Siosiomaga Society to assist the Project Manager at arranging consultations with stakeholders and documenting all activities pertaining to the formulation of the Strategy. A multi-sectoral Steering Committee of representatives of GOs and NGOs stakeholders was formed as the main consultative and overseeing forum for the formulation of the strategy. Besides the formulation of the Strategy an element of local capacity building was incorporated as secondary objective into the project design.

The timetable of activities was as follows:

March 1998	Project proposal approved by UNDP
October 1998	Visit from International Consultant to draft Prodoc
February 1999	BSAP Coordinators Workshop at SPREP attended by Project Manager Regional network of Coordinators/Project Managers established
March 1999	First meeting of NBSAP Steering Committee
May 1999	Samoan Biodiversity Consultant assisted in the formation of five Technical Groups (Biodiversity Review, Conservation, Biodiversity Use, Policy and Legal Framework, Financial Mechanisms).
May-Sept 1999	<u>Phase 1</u> – Stocktaking and Inventory conducted by Technical Groups
August 1999	Prodoc approved by UNDP
September 1999	Second Steering Committee meeting – reviewed draft reports from Technical Groups
September 1999	Final reports from Technical Groups presented
Oct '99 to Jan 2000	Technical Group reports reviewed and summarised by Samoan Biodiversity Consultant O Le Siosiomaga Society, a local NGO, appointed as Project Coordinator. Planning for Phase 2 – Stakeholder Consultation
February 2000	Third Steering Committee meeting
March-Apr. 2000	<u>Phase 2</u> – Stakeholder Consultation Nine workshops held in Upolu (for Women, Youth, Church, Schools, Business, NGO's and Conservation Areas, Pulenuu (village representatives), Farmers, Fishers). Seven workshops held in Savaii (as Upolu but not Church and Business)
April-May 2000	Draft NBSAP produced during visit by International Consultant and Samoan Biodiversity Consultant
May 2000	Revision of First Draft began and formation of Sub-Committees of the Steering Committee to review main sections of the NBSAPS
May – October 2000	Review of Draft NBSAPS main sections continue
July 2000	Local Consultant conducted a Capacity Need Assessment for the Biodiversity Conservation Issues of Samoa



Sept. – Oct. 2000	International Consultant conducted an Economic Valuation Exercise of Samoa's Biological Resources
September 2000	Translation Started
October 2000	National Project Coordinator and Representative of the Steering Committee attended a Regional Financial Mechanism for Implementing NBSAP in Fiji
Nov. – Dec. 2000	Local Consultant to Revised, Edit and Format for Printing NBSAPS key documents and design an Public Awareness Programme to launch NBSAPS implementation
November 2000	National Workshop on Economic Valuation of Natural Resources was held at the Pasefika Inn Apia
December 2000	Finalised and Printed First NBSAP Draft English and Samoan Versions Sub-mission to Cabinet of First NBSAP Draft and Public Awareness Programme
January - Feb. 2001	Implemented Public Awareness Programme
January 2001	Approval by Cabinet of the NBSAP
28 February 2001	<u>Phase 2</u> - Launched NBSAP Implementation

List of Stakeholder Participants in the Steering Committee and different Groupings into various main activities are listed at the Appendix 5.2 and 5.3.

### **1.3.2 CAPACITY BUILDING ACHIEVEMENTS:**

The following achievements have occurred during the formulation of the Strategy:

- Increased awareness and understanding of biodiversity issues by members of Technical Groups and Steering Committee
- Division of Environment & Conservation staff increased their knowledge of biodiversity and associated issues in compiling Technical Reports
- Division of Environment & Conservation staff increased their experience at facilitating workshops with wide range of different groups
- Enhanced local network established between staff of different agencies through meetings and circulation of an NBSAP newsletter
- Regional network established between staff developing NBSAP's in the different countries
- Staff have developed experience in economic valuation methodologies
- Opportunities were made available to employ a wide range of local consultants and experts to facilitate different key activities of the Strategy formulation
- Stakeholders were exposed to several new approaches that are developing world wide to cope with financing biodiversity activities and valuing biological resources



## 2. VISION, GUIDING PRINCIPLE AND GOALS

### A. VISION

***Samoa's biological and genetic resources is protected, conserved and sustainably managed so that it will continue to flourish and regenerate, for present and future generations***

### B. GUIDING PRINCIPLES

#### 1. Samoa's Sovereign Right

Samoa has sovereign rights over her biological diversity and resources.

#### 2. Good Governance and Leadership

The Government of Samoa takes the leading role to ensure the protection, conservation and sustainable management of our biodiversity, through effective governance and leadership and in full consultation with all stakeholders.

#### 3. Collective Responsibility

All residents and visitors have an individual and collective responsibility to protect, conserve and sustainably utilize our biodiversity and its resources, for the benefit of present and future generations.

#### 4. Stakeholder Participation

The full participation and collaboration of all stakeholders is required for the effective coordination and implementation of the NBSAP to ensure accountability and transparency.

#### 5. Traditional Knowledge, Practices and Innovations

Samoaan traditional knowledge, innovations and sustainable practices which are important for the protection and conservation of biodiversity, should be fully recognized, preserved and maintained.

#### 6. In situ<sup>1</sup> and Ex situ<sup>2</sup> Conservation

Biodiversity is best conserved in those places where it naturally occurs (in situ), however ex-situ conservation may be needed to assist in the conservation management of threatened species or forms.

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<sup>1</sup> 'In situ conservation' – conservation of ecosystems and natural habitats, the maintenance and recovery of viable populations of species in their natural surroundings.

<sup>2</sup> 'Ex situ conservation' – conservation of components of biological diversity outside their natural habitats.



## **7. Public Awareness and Capacity Building**

Public awareness, education and the strengthening of local capacity are essential for the protection, conservation and sustainable use of biodiversity.

## **8. Respect for Biodiversity**

Having respect for the intrinsic value of biodiversity resources consistent with the concept of *va tapu'ia*.

### **C. GOALS**

#### **Goal 1 Policies and Legislation**

Samoa will continue to develop, adopt and implement sound national policies, legislation and plans, regional and international conventions, to monitor, protect, conserve and sustainably manage its biodiversity.

#### **Goal 2 Community Involvement**

Encourage and promote greater involvement of the local community in the conservation and sustainable management of Samoa's biodiversity.

#### **Goal 3 Co-operation and Coordination**

All stakeholders including the private sector shall cooperate in an integrated and cross-sectoral manner for the protection, conservation and sustainable management of its biodiversity. Samoa shall cooperate and coordinate with regional and international agencies on biodiversity matters.

#### **Goal 4 Public Awareness**

Public Awareness and understanding of the importance of respecting and sustainably managing our biodiversity will be enhanced through educational programmes at all levels.

#### **Goal 5 Capacity Building**

Improve and strengthen human and institutional capacity at all levels of government, private sector, NGOs and communities, to better achieve Samoa's responsibilities to the environment and to ensure NBSAP objectives are fully achieved.

#### **Goal 6 Protection of Genetic Resources**

Samoa's genetic resources are protected from unsustainable exploitation, while benefits from its use are equitably shared to promote conservation and sustainable use of biodiversity

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<sup>3</sup> *Va tapu'ia* is the fa'asamoa concept of covenant or relationship between people and their environment. This stems from the concept of *feagaiga* relationship or *va tapu'ia* between brother and sister. It has been widely acknowledged and incorporated into the quest for conserving Samoa's environment.



### **Goal 7 Prevention, Control and Eradication**

Prevent, control and eradicate harmful native and alien species, which impede the restoration of endangered species and sustainability of Samoa's biodiversity.

### **Goal 8 Social and Economic Development**

Social and Economic development through the utilization of biodiversity resources shall be guided by precautionary principles and sustainable measures.

### **Goal 9 Education**

Education curriculum at all levels have integrated conservation and sustainable use of biological and genetic resources



*Traditional Canoe: Saanapu Mangrove Conservation Area*



## 3. STRATEGY & ACTION PLAN

### 3.1 THEME 1: MAINSTREAMING BIODIVERSITY

#### Strategy Goal:

The conservation and sustainable use of biodiversity is vital to the development of Samoa as reflected in the overall vision of Government in its Statement of Economic Strategies.

*Biodiversity work in Samoa has been implemented over the years in a sectoral approach mainly in the domain of Environment, Forestry and Fisheries. Through this sectoral approach, biological resources continued to deplete at a rapid rate as other sectors of Government and the private sector continued developments that do not consider their adverse impacts on biodiversity. The loss of biodiversity and its adverse impact on the future of Samoa's social and economic development will continue if different sectors do not work together for better solutions.*

*The development of the National Biodiversity Strategy and Action Plan, re-emphasised the importance of an integrated approach to promoting the conservation and sustainable use of biodiversity. It calls for the strengthening of collaboration between all sectors of government along with private sector, non-government organisations and civil society for an effective implementation and monitoring of this plan. Conscious efforts must be taken by all stakeholders to ensure that impacts of their individual work on biodiversity is kept at a minimum or none at all while promoting efforts to document, conserve and sustainably use Samoa's biodiversity.*

#### Strategy for integrating conservation and sustainable use of biodiversity into national, sectoral and cross-sectoral plans, policies and programmes

#### Objective 1: Policy

To integrate concepts of conservation and sustainable use of Biodiversity into all relevant sectoral policies, programmes and plans.

**Monitoring Goal:** *Conservation and sustainable use concepts have been integrated and used in policies, plans and programmes of all the government ministries.*

#### Actions:

- 1.1 *To include the NBSAP issues in the next national plan along with CBD principles such as the precautionary principle, and issues such as financing biodiversity, ensuring that biodiversity considerations is effectively incorporated in governments developmental policies.*

#### **Key Players:**

DLSE, TSY, MAFFM, TCI, MFA, AG, ED, HD, MIA, MWA, CUS, NGOs, MYSC, VC





## **THEME 1 - Mainstreaming Biodiversity**

### **Key Players:**

- 1.2 *Provide Policy Advice with regards to amendments of the existing policies and development of new policies, reflecting NEMS framework.*

DLSE, TSY, MAFFM, TCI, MFA, AG, ED, HD, MIA, MWA, CUS, NGOs, YSC, VC

### **Objective 2: Multi-sectoral Collaboration**

To improve and strengthen Multi-sectoral Collaboration in promoting conservation and sustainable use of biodiversity in Samoa.

**Monitoring Goal:** *Multi-sectoral team including government agencies, statutory bodies, NGO's communities and private sector has been set up and activities developed to promote collaboration on all biodiversity related activities.*

#### **Actions:**

- 2.1 *Enhance and strengthen the existing NBSAP multi-sectoral team consisting of Government Agencies, NGOs, Private Sector and Community Groups to advise on the sustainable management of Samoa's biological and genetic resources, and contribute to Samoa's participation at international and regional environmental consultations.*
- 2.2 *Establish a multi-sectoral team of scientists and experts to conduct biological studies and undertake monitoring programmes on biodiversity.*
- 2.3 *Establish and maintain regular consultations and communication links between all stakeholders on international and regional treaties for the conservation and sustainable use of biodiversity.*

DLSE, TSY, MAFFM, TCI, MFA, AG, ED, HD, MIA, MWA, CUS, NGOs, MYSC, VC

DLSE, MAFFM, USP, NUS, MIA, MWA, NGOs

DLSE, MFA, MAFFM, DTICI

### **Objective 3: Legislation**

To ensure that appropriate legislation is developed and effectively enforced to sustainably manage Samoa's Biodiversity.

#### **Actions:**

- 3.1 *Amend the Lands, Survey and Environment Act 1989 to incorporate NBSAP's recommendations.*
- 3.2 *Develop, adopt and enforce EIA legislation to minimise the adverse impacts of developments on the environment.*
- 3.3 *Ensure the integration of objectives and actions of NBSAP into legislative amendments being undertaken by relevant departments, to ensure consistency across all sectors concerned.*

DLSE, AG, MAFFM, TSY

DLSE, TSY, MAFFM, DTICI, MFA, AG, ED, HD, MIA, MWA, CUS, NGOs, YSC, VC

DLSE, TSY, MAFFM, TCI, MFA, AG, ED, HD, MIA, MWA, CUS, NGOs, YSC, VC, PWD



## **THEME 1 - Mainstreaming Biodiversity**

### **Key Players:**

- |     |   |  |
|-----|---|--|
| 3.4 | <i>Integrate the protection of species from the impact of oil spill and marine pollution into the appropriate legislation.</i>  | DPP, DLSE, MOT, MAFFM, AG, PA, SSC, DJ, OIL COMPANIES                          |
| 3.5 | <i>Review the status of wildlife identified and make appropriate monitoring and enforcement amendments to the Wild Animals Ordinance 1993.</i>  | DLSE, MAFFM, AG  |
| 3.6 | <i>Develop appropriate legislation on biosecurity to include risk management on genetically modified organisms, invasive alien species, and effective border control.</i>                                   | DLSE, DTIC, CUSTOMS, MAFFM, AG, USP, NGOs                                      |
| 3.7 | <i>Develop appropriate sui generis legislation for the protection of traditional knowledge and equitable benefit sharing, which are important for the conservation and sustainable use of biodiversity.</i> | DLSE, TSY, MAFFM, MFA, AG, ED, HD, MIA, MWA, CUS, NGOs, YSC, VC, PWD, USP, NUS |
| 3.8 | <i>Finalise, enact and enforce Environment (Bioprospecting) Regulations.</i>  | DLSE, AG, MAFFM, DJ, NGOs  |
| 3.9 | <i>Amend the Village Fono Act and set up relevant by-laws to decentralise the enforcement of some of the biodiversity destruction offences but based on the assessment of appropriate authority.</i>        | MIA, DLSE, AG, MAFFM, DJ, NGOs   |

### **Objective 4: Environment Impact Assessments**

To ensure that EIAs are conducted for all development projects to minimise any adverse impacts on Samoa's Biodiversity.

#### **Actions:**

- |     |   |  |
|-----|---|--|
| 4.1 | <i>To develop relevant EIA policies.</i>  | DLSE, AG, MAFFM, SWA, PWD, EPC, SVB, TSY |
| 4.2 | <i>Undertake biological surveys and assessments as an integral part of EIA procedures.</i>  | DLSE, MAFFM, SWA, PWD, EPC, SVB, TSY     |
| 4.3 | <i>Integrate the assessment of development impacts on biodiversity as part of the code of practice for natural resource extraction.</i> | DLSE, MAFFM, SWA, PWD, EPC, SVB, TSY     |
| 4.4 | <i>Integrate economic valuation into EIA as an integral part.</i>   | DLSE, MAFFM, SWA, PWD, EPC, SVB, TSY     |
| 4.5 | <i>Regularly review and update existing EIA procedures.</i>   | DLSE, MAFFM, SWA, PWD, EPC, SVB, TSY     |



## **THEME 1 - Mainstreaming Biodiversity**

### **Key Players:**

### **Objective 5: Capacity Building:**

To develop and enhance local capacity to ensure the effective implementation and enforcement of policies and legislation for the conservation and sustainable use of Samoa's Biodiversity.

#### **Actions:**

- |     |   |                                      |
|-----|---|--------------------------------------|
| 5.1 | <i>Develop a national clearinghouse mechanism based on the CBD-CHM for disseminating and sharing of information on biodiversity work.</i>   | DLSE, MFA, MAFFM, USP, NUS, MIA      |
| 5.2 | <i>To conduct national seminars involving all key stakeholders on policies and plans relating to conservation and sustainable management of biodiversity.</i>   | DLSE, ED, NUS, MAFFM, MIA, NGOs, MWA |
| 5.3 | <i>Develop public awareness materials on all legislations relating to biodiversity use for disseminating to the people.</i>   | DLSE, ED, NUS, USP, MIA, NGOs, MWA   |
| 5.4 | <i>Implement and co-ordinate media programmes to raise awareness.</i>   | DLSE, NEWSPAPERS, TVS, BROADCASTING  |
| 5.5 | <i>Promote and encourage access to and the use of materials available at the various departments.</i>   | DLSE, MAFFM, MIA, ED                 |
| 5.6 | <i>Encourage the use of Participatory Rural Appraisals approach in awareness and educational programmes.</i>  | MIA, MWA, DLSE, NGOs, MAFFM, MYCSA   |
| 5.7 | <i>Develop training programmes for:</i><br>(i) <i>All personnel involved in the formulation and implementation of conservation related policies and legislation.</i><br>(ii) <i>Communities for enforcement of policies and legislation.</i><br>(iii) <i>Inclusion of policies and regulations in educational curriculum.</i> | DLSE, MIA, AG, ED, NGOs              |
| 5.8 | <i>Provide capacity building training for local communities on the principles and benefits of EIA, so they can apply EIA on developments at their local communities.</i>  | DLSE, ED, MIA, MWA, MYSCA, NGOs, VC  |



## **THEME 2 - Ecosystem Management**

## **Key Players:**

### **3.2 THEME 2: ECOSYSTEM MANAGEMENT**

#### **Strategy Goal:**

To increase the percentage of Samoa's protected and conserved areas from the existing 10 % of total land including coastal areas.

*The biodiversity of Samoa is particularly important in the context of the South Pacific. A review of the conservation value of a total of 226 South Pacific Islands ranked three of the islands of Samoa highly, Savaii at number 23, the Aleipata Islands number 30 and Upolu number 46. The South Pacific Biodiversity Conservation Programme recognises Samoa as one of five countries participating in the programme that are particularly important for their wealth of biodiversity. The flora is one of the most diverse in Polynesia with about a quarter of the plants endemic, i.e. found nowhere else. The importance of the country's birdlife, particularly the proportion of endemic species 23%, and the threats to it have been recognised by the International Council for Bird Preservation who have listed the Samoan Islands as one of the world's 'Endemic Bird Areas' in need of 'urgent' conservation attention.*

*Samoa's biodiversity is among the richest and diverse of the Polynesian Islands. They contribute to the maintenance of over 19 terrestrial vegetation types, coral reefs, mangrove forests, and sea grass beds which in turn had provided for all the needs of Samoans in the past. Such needs range from providing food, to providing shelters, utensils and even the development of Samoa's culture. This biological diversity of life found in Samoa is threatened from extinction due to the unsustainable harvest of natural resources and associated development projects. The spread of alien introduced species have also contributed to the loss of native biodiversity. In addition the increased veracity and frequency of natural extreme phenomenon such as cyclones, droughts and forest fires together with the spread of invasive species, have resulted in the rapid depletion of native biodiversity. This continual loss will severely erode the natural basis of the country's developments.*

#### **Strategy for the Conservation and Sustainable use of Ecosystems**

#### **Objective 1: Research and Monitoring**

To promote and encourage research for identification, documentation and monitoring of Samoa's ecosystems for the implementation of appropriate management programs.

#### **Actions:**

1.1 Undertake biological surveys of Samoa's freshwater ecosystems.

DLSE, MAFFM, NUS,  
USP, MIA



## **THEME 2 - Ecosystem Management**

### **Key Players:**

- |     |   |                                       |
|-----|---|---------------------------------------|
| 1.2 | <i>Undertake biological surveys of key upland sites not visited in the National Upland Ecological Survey of 1998, e.g. Sili Upland forest, Itu Salega and Gataivai Upland forest.</i> | DLSE, MAFFM, NUS, USP, MIA            |
| 1.3 | <i>Undertake a complete survey of Samoa's inshore biodiversity.</i>   | DLSE, MAFFM, NUS, USP, MIA            |
| 1.4 | <i>Develop and implement a long term monitoring programme for Samoa's native ecosystems including invasive species.</i>   | DLSE, MAFFM, NUS, USP, MIA            |
| 1.5 | <i>Develop a list of priority research topics and monitoring techniques to be used by students and staff of natural resource sectors.</i>   | DLSE, MAFFM, NUS, MIA, ED, USP        |
| 1.6 | <i>Develop a code of conduct for biodiversity and bioprospecting research in Samoa.</i>   | DLSE, MAFFM, AG, MFA, PMD             |
| 1.7 | <i>Publish and make available to the public research reports.</i>   | DLSE, MAFFM, MIA, NUS, USP            |
| 1.8 | <i>Develop a programme for the identification of genetic resources from Samoa's biological resources.</i>   | DLSE, MAFFM, NUS, USP, MIA, MWA, NGOs |
| 1.9 | <i>Develop and implement a programme for monitoring the impacts of biodiversity from Climate change.</i>  | DLSE, MAFFM, NUS, USP                 |

### **Objective 2: Conservation Areas**

To enhance the management of existing protected areas and establish ones to increase coverage of protected areas to 15 % and achieve a full representative of Samoa's ecosystems.

*Monitoring Goal: Total land area under conservation or sustainable management framework.*

#### **Actions:**

- |     |  |                                 |
|-----|--|---------------------------------|
| 2.1 | <i>Develop and implement management plans for the existing protected areas in Samoa.</i>   | DLSE, MAFFM, NGOs, VC           |
| 2.2 | <i>Establish conservation areas in under represented ecosystems e.g. Mangrove areas.</i>   | DLSE, MAFFM, NGOs, VC, MIA      |
| 2.3 | <i>Establish large conservation areas which include more than one ecosystem, in high priority sites identified in lowland and upland ecological surveys such as Aopo, Sili, Salailua, and Eastern Upolu,utilizing community management approaches.</i> | DLSE, MAFFM, NGOs, VC, MIA, MWA |



## **THEME 2 - Ecosystem Management**

### **Key Players:**

- |     |  |                                 |
|-----|--|---------------------------------|
| 2.4 | <i>Encourage the development of a marine protected areas representative system built upon the existing programmes.</i>                                   | DLSE, MAFFM, MIA, MWA, VC, NGOs |
| 2.5 | <i>Develop appropriate information systems such as GIS to store and share information of ecosystems and protected areas.</i>                             | DLSE, MAFFM, PWD                |
| 2.6 | <i>Extend the watershed programme to all the priority areas and the smaller village-based water-catchment areas.</i>                                     | MAFFM, DLSE, SWA, VC, MIA, MWA  |
| 2.7 | <i>Develop and implement programmes for the restoration of degraded ecosystems such as the Vaitoloa rubbish dump, mangrove area and watershed areas.</i> | DLSE, MAFFM, SWA, VC            |
| 2.8 | <i>Formalise the conservation of biodiversity in traditional sites and site attractions.</i>   | SVB, MIA, SMA, VC               |

### **Objective 3: Sustainable Use of Ecosystem**

To develop and effectively manage programs that promote the sustainable use of Samoa's ecosystems.

**Monitoring Goal:** *Number of sustainable use guidelines and management plans developed for different ecosystems in Samoa*

#### **Actions:**

- |     |   |   |
|-----|---|---|
| 3.1 | <i>Develop guidelines for the sustainable use of biodiversity resources through activities such as eco-tourism, non-forest timber products, and natural products.</i> | DLSE, MAFFM, SVB, DTCI, SMA, MIA, NGOs, CHAMBER OF COMMERCE, VC |
| 3.2 | <i>Undertake economic valuation of ecosystem services for terrestrial, aquatic and marine area use.</i>   | DLSE, MAFFM, SVB, DTCI, TSY, MIA, VC                            |
| 3.3 | <i>Identify sustainable management options for the cultivation of land.</i>   | DLSE, MAFFM, MIA, SLC   |
| 3.4 | <i>Identify options to allow all marines biodiversity to be managed sustainably.</i>  | DLSE, MAFFM, MIA  |
| 3.5 | <i>Develop and promote integrated management approaches for all lands under customary tenure.</i>   | DLSE, MAFFM, SLC, MIA, DTCI, SVB, VC, USP, NUS                  |
| 3.6 | <i>Develop and implement integrated coastal management programmes.</i>  | DLSE, MAFFM, SLC, MIA, DTCI, SVB, VC, USP, NUS                  |



## **THEME 2 - Ecosystem Management**

### **Key Players:**

- 3.7 *Implement the programme to complete phase out commercial logging operations in native forests.*

DLSE, MAFFM, SVB

### **Objective 4: Capacity Building**

To develop and enhance local capacity to ensure the sustainable management of Samoa's ecosystem.

**Monitoring Goal:** *Number of biodiversity research and training by Samoans.*

#### **Actions:**

- 4.1 *Develop and implement local capacity building programmes on biological surveys, monitoring techniques and ecosystem management.*

DLSE, MAFFM, USP, NUS

- 4.2 *Establish a multi-sectoral group of national/local experts to co-ordinate and undertake biological surveys and monitoring programmes.*

DLSE, MAFFM, NGOs, USP, NUS

- 4.3 *Provide and implement national/local training on community-based conservation management approaches.*

DLSE, MAFFM, NUS, VC, MIA, MWA, NGOs

- 4.4 *Develop and implement appropriate training for communities on sustainable income generating activities.*

DLSE, MAFFM, NUS, VC, MIA, MWA, NGOs, TSY

- 4.5 *Establish a Conservation Management committee of key agencies to assess and review appropriate approaches for improving the management of conservation areas.*

DLSE, MAFFM, NGOs, USP, NUS

### **Objective 5: Public Awareness and Education**

To increase public awareness and understanding on the importance of Samoa's ecosystems to ensure their sustainable management.

**Monitoring Goal:** *Proportion of Samoa's population with good understanding of the importance of the conservation of biodiversity.*

#### **Actions:**

- 5.1 *Coordinate a programme between relevant agencies to utilize information on Samoa's biodiversity for use and integration into school curriculum, youth and rural development programmes.*

DLSE, MAFFM, MYSCA, MWA, MIA, SVB, NGOs, ED





### **THEME 3 - Species Management**

### **Key Players:**

5.2 <i>Develop and implement public awareness and educational programme on the importance and management of ecosystems.</i>	DLSE, MAFFM, MYSCA, MWA, MIA, SVB, NGOs, ED
5.3 <i>Develop national public awareness campaigns based on the Sea Turtle and Manumea programmes as flagship species for ecosystems.</i>	DLSE, MAFFM, MYSCA, MWA, MIA, SVB, NGOs, ED
5.4 <i>Establish networking information sharing on the importance of Samoa's ecosystem through educational programmes.</i>	DLSE, MAFFM, MYSCA, MWA, MIA, SVB, NGOs, ED
5.5 <i>Disseminate information on importance of Samoa's ecosystem through local media.</i>	DLSE, MAFFM, MYSCA, MWA, MIA, SVB, NGOs, ED, TVS, BROADCASTINGS, NEWSPAPERS
5.6 <i>Develop a core set of public awareness materials and displays on conservation for public display, promotional tours, and distribution to the local communities.</i>	ED, MWA, MYSCA, MIA, NGOs

## **3.3 THEME 3: SPECIES MANAGEMENT**

### **Strategy Goal:**

To promote the conservation of Samoa's native and other important species and provide mechanisms for their sustainable use.

*Samoa's species biodiversity is among the richest and most diverse of the Polynesian Islands. In brief, this diversity includes over 800 species of native vascular plants, 35 native land birds and 21 sea birds, over 900 marine fish and invertebrates, over 90 species of corals, 16 species of marine and land mammals, 15 species of reptiles, 21 species of butterflies, over 20 species of land snails, around 60 species of ants. Even more important is the fact that around 30% of this native biodiversity is endemic to Samoa, thus the need for action to protect them from extinction*

*Species threatened with extinction have been identified in plants, birds, butterflies, land-snails, and marine reptiles, i.e. they are probably found in all flora and faunal groupings. It may be possible to identify the key threats in some cases and carry out management to alleviate these. Such actions are identified here. However for most groups the best approach is to manage representative samples of each ecosystem.*



## **THEME 3 - Species Management**

## **Key Players:**

*Due to the lack of information on the status of the species of Samoa, some of them may be threatened or even extinct such as the Punae which has not been seen for almost 100 years. More traditionally useful and recognisable species of rapidly decreasing numbers include forest species such as ifilele, pau, and pani, ornamental plants such as lagaali, pua (tiare), suni vao and seasea, medicinal plants such as manunu, and ago. Other useful plants include fisoa (Samoan soap), fagu (used as bottles prior European contact), and ie'ie ( used for weaving fish traps). Additional to plants are some of our important bird species such as the manumea, and tuaimo (recorded only to be present around the inland forest or Savaii, and the Aleipata islands of Nuutele and Nuulua).*

*A great importance is also placed on conserving our biodiversity as they have the potential to provide cures for diseases and useful for other pharmaceutical purposes as we have now seen with a'va and other lesser useful plant such as nonu, and possibly fogamamala.*

*Species further provide an important function to the maintenance of our biodiversity as seen with the pollination and dispersal of seedlings function being provided by the pe'a.*

*To date the management of Samoa's species has been limited to controls on hunting, awareness campaigns and trade of threatened species, monitoring of the status of some species and biological surveys to identify the diversity of life in Samoa.*

**Strategy for the Conservation and Sustainable Use of Species.**

### **Objective 1: Conservation of Species**

To enhance the status of native and other important species in Samoa through effective conservation programmes.

**Monitoring Goal:** *Number of programmes to conserve and sustainably manages Samoa's threatened native species.*

#### **Actions:**

- 1.1 *Establish and maintain a complete threatened species list for Samoa and provide regular updates to appropriate regional and international organisation directories.*
- 1.2 *Develop and implement recovery programmes for all endangered species.*
- 1.3 *Fully develop Botanical Gardens to house collections of Samoa's native plant species.*

DLSE, MAFFM, MFA, NUS, USP

DLSE, MAFFM, MIA, VC, NGOs

DLSE, MAFFM, NUS, USP



### **THEME 3 - Species Management**

### **Key Players:**

- |     |  |                                      |
|-----|--|--------------------------------------|
| 1.4 | <i>Assess the need for Samoa's participation in international and regional efforts to protect migratory species.</i>   | DLSE, MAFFM, MFA, AG                 |
| 1.5 | <i>Explore the feasibility of establishing captive breeding/spawning programmes as a security from natural occurrences and alien/invasive introductions.</i> | DLSE, MAFFM, USP, NUS, MIA           |
| 1.6 | <i>Review the list of threatened species to determine those appropriate for recovery programmes including propagation.</i>                                   | DLSE, MAFFM, USP, NUS, MIA, VC       |
| 1.7 | <i>Develop and implement a programme for the conservation of threatened species.</i>   | DLSE, MAFFM, USP, NUS, MIA, VC       |
| 1.8 | <i>Explore and assess the feasibility of setting up an aquarium/zoo for conservation of species.</i>   | DLSE, MAFFM, NUS, USP, TSY, DTCl, AG |

### **Objective 2: Research and Monitoring**

To promote and encourage research for identification, documentation and monitoring of species and the implementation of appropriate conservation and management programmes.

**Monitoring Goal:** *Number of researchs to identify and monitor native species.*

#### **Action:**

- |     |   |                                      |
|-----|---|--------------------------------------|
| 2.1 | <i>Establish and undertake monitoring programmes for threatened species to assess the status of those that may be included or taken off the Wild Animals Ordinance.</i> | DLSE, MAFFM, MIA, AG, VC             |
| 2.2 | <i>Undertake a research programme to complete the collection and identification of Samoa's fauna and flora.</i>   | DLSE, MAFFM, NUS, USP, VC            |
| 2.3 | <i>Develop a project to search for the Puna.</i>  | DLSE, MAFFM, NUS, USP, MFA, MIA      |
| 2.4 | <i>Carry out a survey to determine the status of Samoa's seabird population.</i>  | DLSE, MAFFM, MIA, VC                 |
| 2.5 | <i>Establish a herbarium for Samoa.</i>   | DLSE, MAFFM, NUS, USP, NGOs, TSY, VC |



### **THEME 3 - Species Management**

### **Key Players:**

- |     |   |   |
|-----|---|---|
| 2.6 | <i>Establish a database for the technical, financial and marketing assistance for all environmentally friendly technologies and developments (such as organic farming).</i> | DLSE, MAFFM, TSY, DTCl, POLYTECH, NUS, NGOs |
| 2.7 | <i>Develop a monitoring programme to monitor the adverse impact of coral bleaching and other invasive species infestation in Samoa.</i>                                     | DLSE, MAFFM, MIA, VC                        |
| 2.8 | <i>Evaluate and assess the effectiveness of past species campaign approaches to assist with the development of new conservation programmes.</i>                             | DLSE, MAFFM, NGOs, MIA, MWA, ED, VC         |

### **Objective 3: Sustainable Use and Management of Species**

To ensure the sustainable use and management of species for social and economic development.

**Monitoring Goal:** *Number of sustainable use and management plans for threatened species biodiversity.*

#### **Actions:**

- |     |  |   |
|-----|--|---|
| 3.1 | <i>Develop management plan for the sustainable harvesting of lupe as a pilot study for culturally important species.</i>   | DLSE, MAFFM, NGOs, MIA, VC  |
| 3.2 | <i>Build on existing programmes and extend them to cover other areas for the sustainable harvest of indigenous forest timber and non-timber trees.</i>   | DLSE, MAFFM, NGOs, MIA, VC  |
| 3.3 | <i>Support the extension of the indigenous forest regeneration and rehabilitation programmes.</i>  | DLSE, MAFFM, MIA, LOGGING COMPANIES, VC                                 |
| 3.4 | <i>Develop programmes for the sustainable harvest of inshore/offshore fisheries.</i>   | DLSE, MAFFM, MIA, DTCl, VC, FISHERMEN ASSOCIATION, SAMOA FISH EXPORTERS |
| 3.5 | <i>Develop and encourage sustainable aquaculture/freshwater and marine culture.</i>  | DLSE, MAFFM, SWA, EPC, NGOs, VC   |
| 3.6 | <i>Develop programmes for sustainable harvesting of ornamental plants.</i>   | DLSE, MAFFM, MWA, SVB, FLOWER GROWERS, VC, WIB                          |
| 3.7 | <i>Develop nurseries and botanical plots by local communities for growing medicinal plants.</i>  | DLSE, MAFFM, NGOs, MIA, VC  |
| 3.8 | <i>Identify significant species important for the ecotourism industry and develop programmes that promote their sustainable use (e.g. game fishing, whale watching, bird watching, medicinal tours, mangrove tours, tropical agriculture tours).</i> | DLSE, MAFFM, SVB, DTCl, VC  |



### **THEME 3 - Species Management**

### **Key Players:**

3.9 *Establish environmental certification (green products) for natural resource extraction within the private sector for products that are produced according to sustainable standards (e.g. forest stewardship certification, marine stewardship council and tropical fisheries).*

DLSE, MAFFM, AG, CUS, SAWMILLERS, FISHERMEN ASSOCIATION, TSY

3.10 *Provide technical, financial and marketing assistance and support for all environmentally friendly development (such as organic farming).*

DLSE, MAFFM, SVB, TSY, MFA, DBS, COMMERCIAL BANK, FARMERS ASSOCIATION, PRIVATE SECTORS ALLOCATION SCHEME, LOCAL FINANCIAL INSTITUTIONS

#### **Objective 4: Public Awareness & Education**

To enhance knowledge and understanding of the public on the conservation, sustainable use and management of Species.

**Monitoring Goal:** *Proportion of population with commitment to conserve and sustainably manage native species.*

#### **Actions:**

4.1 *Develop public awareness campaigns to increase appreciation of functions and benefits of biodiversity by Samoans utilising the previous campaign approaches.*

DLSE, MAFFM, NUS, USP, MIA, NGOs, VC

4.2 *Develop public awareness programmes for all stakeholder groups on sustainable use management of native and other important species.*

DLSE, MAFFM, NUS, USP, MIA, NGOs, VC, ED

4.3 *Integrate information on the sustainable use and management of native and other important species into school curriculum at all levels.*

DLSE, MAFFM, ED, NUS, USP, MIA, NGOs, VC

#### **Objective 5: Capacity Building**

To enhance and strengthen the capacity of all Samoans to ensure the sustainable use, management and conservation of native and other important species.

#### **Actions:**

5.1 *Develop and implement local capacity building programmes on biological surveys, monitoring techniques and species management.*

DLSE, MAFFM, NUS, USP, MIA, NGOs, VC, ED

5.2 *Establish a multi-sectoral group of national/local experts to co-ordinate and undertake species conservation, biological surveys and monitoring programmes.*

DLSE, MAFFM, NUS, USP, MIA, NGOs, VC, ED



## **THEME 4 - Community**

## **Key Players:**

- 5.3 *Provide and implement national/local training on community-based species conservation management approaches.*
- 5.4 *Develop and implement appropriate training for communities to promote the sustainable use of species as a possible income generating activities.*
- 5.5 *Establish a Conservation Management committee to assess and review appropriate and effective approaches for the conservation and management of species.*

DLSE, MAFFM, NUS, USP, MIA, NGOs, VC, ED

DLSE, MAFFM, NUS, USP, MIA, NGOs, VC, ED, SVB, DTCl, TSY, WIB

DLSE, MAFFM, MIA, MWA, MYSCA, NGOs

## **3.4 THEME 4: COMMUNITY**

### **Strategy Goal:**

**Empowering and encouraging traditional communities to protect, conserve and sustainably use and manage our biodiversity.**

*Samoa's natural biodiversity heritage nurtured and preserved by our ancestors is facing a crisis of being destroyed. The loss of the biodiversity further leads to the erosion of the cultural heritage based on the use and preservation of the biodiversity.*

*To ensure that the present generations needs are met while not destroying the livelihood for our children, concerted efforts must be made by everyone to ensure those making the decisions on the conservation or the utilization of our natural biodiversity heritage are able to do so with all the necessary information available to them.*

*With over eighty percent of Samoa's total land area under the customary ownership tenure, it is vital that the villages and local communities through relevant programmes increase their understanding on the consequences and impacts of their actions on the future of biodiversity and consequently the livelihood of Samoa and its future generations.*

*Village communities, as owners of the land have already got the power to do what they want on such lands. There is nothing anyone can do to change that. Therefore empowering communities is to equip them with the skills and knowledge to be able to use that power wisely. From this context, activities such as training in decision-making, resource management and conflict resolution would appear more appropriate.*



## **THEME 4 - Community**

### **Key Players:**

*Furthermore, villages and local communities need to be empowered to promote the conservation and sustainable use of biodiversity at the village level, through the acknowledgement and support given to the village councils and traditional authorities to enforce and monitor national laws and regulations, while providing necessary incentives to improve the standard of living.*

### **Strategy and Action Plan to Empower Communities to conserve and sustainably use biodiversity**

#### **Objective 1: Traditional Knowledge, Practices and Innovation**

Preserving traditional knowledge, practices and innovation of Samoa that are important for the protection, conservation and sustainable use of biodiversity.

*Monitoring Goal: Number of programmes undertaken to preserve traditional knowledge, practices and innovations.*

#### **Actions:**

1.1 *Conduct research and develop a national register to document and preserve traditional knowledge, practices and innovation important for the conservation of biodiversity.*

DLSE, MIA, ED, USP, POLYTECH, NUS, MYSCA, MAFFM, MWA, VC, NGOs

1.2 *Develop sui generis legislation to protect traditional Samoan knowledge, practices and innovation, and to provide benefit sharing mechanisms for appropriate knowledge holders.*

AG, DLSE, MIA, MAFFM, MYSCA, MWA, VC, NGOs

1.3 *Develop appropriate legislation that promotes the decentralization of monitoring and enforcement of Environmental regulations to village and local communities.*

MIA, DLSE, AG, MAFFM, DPP, DJ, VC

1.4 *Integrating modern science and technology with traditional knowledge, practices and innovation to promote the conservation and sustainable use of biodiversity.*

MAFFM, NUS, USP, POLYTECH, DLSE, ED, HD, VC, NGOs

#### **Objective 2: Empowering Communities**

Empowering communities to conserve and sustainably manage biodiversity under customary resource tenure.





## **THEME 4 - Community**

### **Key Players:**

**Monitoring Goal:** *Number of villages with conservation areas or have incorporated sustainable use guidelines to village decision making processes.*

#### **Actions:**

- |     |   |  |
|-----|---|--|
| 2.1 | <i>Review and improve the implementation of appropriate approaches for village and district community programmes for the conservation and the sustainable use of biodiversity.</i>              | DLSE, MAFFM, MIA, MWA, SWA, MYSCA, SVB, VC, NGOs               |
| 2.2 | <i>Integrate activities that promote the conservation and sustainable use of biodiversity into relevant agencies' outreach programmes.</i>  | DLSE, MAFFM, MIA, MWA, MYSCA, ED, SVB, VCs, NGOs               |
| 2.3 | <i>Encourage the full participation of all the different target groups in villages through the co-ordination and implementation of conservation and sustainable use programmes.</i>             | DLSE, MAFFM, MIA, MWA, MYSCA, ED, SVB, HD, SWA, NGOs           |
| 2.4 | <i>Establish an award/incentive scheme for environmentally friendly villages that promote conservation and the sustainable use of biodiversity.</i>   | DLSE, MAFFM, MIA, MWA, MYSCA, NGOs, ED, SVB, HD, SWA, DTCI     |
| 2.5 | <i>Promote inter village/district exchange programmes for the dissemination of information and sharing of experience on the conservation and sustainable management or use of biodiversity.</i> | DLSE, MAFFM, MIA, MWA, MYSCA, ED, SVB, HD, SWA, TSY, DTCI, MFA |

### **Objective 3: Public Awareness & Education**

To promote, encourage and strengthen awareness and understanding of local communities on the importance of protecting, conserving and in the sustainable management/use of our biodiversity through appropriate awareness campaigns and educational programmes.

#### **Actions:**

- |      |   |  |
|------|---|--|
| 3.1. | <i>Develop and implement public awareness programmes for village councils and relevant target groups on the functions and benefits of conserving and the sustainable use of biodiversity.</i>                                       | DLSE, MAFFM, MIA, MWA, MYSCA, ED, SVB, HD, SWA, VC, NGOs, YMCA |
| 3.2  | <i>Promote and conduct public awareness campaigns and programmes through media, workshops/seminars and information materials for communities to enable them to make appropriate decisions on the use of their natural heritage.</i> | DLSE, MAFFM, MIA, MWA, MYSCA, NGOs, ED, SVB, HD, SWA, VC       |
| 3.3  | <i>Intergrate information on traditional knowledge that is important for the conservation and sustainable use of biodiversity into the education curriculum.</i>  | DLSE, MAFFM, MIA, MWA, MYSCA, VC, NGOs, HD, SVB, ED            |



## **THEME 5 - Access & Benefit Sharing**

### **Key Players:**

### **Objective 4: Capacity Building**

To build the capacity of traditional communities in the co-ordination and implementation of conservation and appropriate biodiversity programmes.

#### **Actions:**

4.1 Provide capacity building training for traditional communities<sup>4</sup> in undertaking community-based biological studies and monitoring programmes.

DLSE, MAFFM, MIA, MWA, MYSCA, VCs, NGOs, ED, NUS, USP, HD, SWA

4.2 Provide training for villages on their legal rights and appropriate procedures for reporting environmental offences.

DLSE, MIA, MWA, AG, ED, MYSCA, NGOs, VCs

4.3 Provide training programmes for traditional communities on the development and management of conservation programmes.

DLSE, MAFFM, MIA, MWA, MYSCA, VCs, NGOs, YMCA, ED, NUS, USP, HD, SWA

## **3.5 THEME 5: ACCESS & BENEFIT SHARING FROM USE OF GENETIC RESOURCES**

### **Strategy Goal:**

Samoa's genetic resources are accessible for utilization and benefits derived are equitable shared amongst the stakeholders.

*One of the main objectives of the Convention on Biological Diversity is to ensure the equitable sharing of benefits from the use of genetic resources.*

*To date, foreign interests have benefited both financially and academically from the use of Samoa's genetic resources with almost none of it returning to the traditional scientist that nurtured and first identified the pharmaceutical, ornamental or economic value of such resources. Furthermore, the ownership of such genetic resources now resides with most of these outside interests. Examples such as the loss of ownership right and possibly financial benefits over the genetic resources found in the A'va, nonu and fogamamala can be clear indications of why immediate action needs to be taken to protect this one of the last frontiers of the natural heritage which Samoans have control.*

*Samoa therefore, needs to put in place legal frameworks and infrastructure to facilitate the continual availability of its genetic resources for future scientific*

<sup>4</sup>Communities here refer to those communities that are already involved in conservation programmes.



## **THEME 5 - Access & Benefit Sharing**

*research but ensure that benefits derived from such ventures through appropriate benefit sharing mechanisms acknowledge the ownership and traditional knowledge associated with the genetic resources.*

### **Strategy and action plan to facilitate access to and benefit sharing from the use of genetic resources.**

*Monitoring Goal: Regimes are developed to facilitate access and benefit sharing from the use of genetic resources.*

#### **Objective 1: Access to & Equitable Sharing of Benefits of Genetic Resources**

To establish appropriate national measures to effectively access genetic resources and carry out fair and equitable sharing of benefits for the use of these resources.

##### **Actions:**

- |     |   |   |
|-----|---|---|
| 1.1 | <i>Finalise and enact the Environment (Bioprospecting) Regulations.</i>   | DLSE, MAFFM, MIA, MWA, MYSCA, VC, NGOs, YMCA, AG, ED, DJ, DPP                   |
| 1.2 | <i>Develop procedures to ensure that the Environment (Bioprospecting) Regulations are effectively enforced and monitored.</i>   | DLSE, MAFFM, AG, DJ, NGOs   |
| 1.3 | <i>To explore the need of establishing a National Bioprospecting Coordinating Body.</i>   | DLSE, MAFFM, AG, DJ, NGOs, MIA, DPP, VC   |
| 1.4 | <i>Develop benefit sharing mechanisms for holders of knowledge and owners of resources utilised in bioprospecting.</i>  | DLSE, MAFFM, AG, DJ, MIA, DTCl, USP, NUS, MFA, CUS, TSY, HD, ED, PMD, MWA, NGOs |
| 1.5 | <i>Develop mechanisms for access to traditional knowledge and genetic resources.</i>  | DLSE, MAFFM, AG, DJ, MIA, DTCl, USP, NUS, MFA, CUS, TSY, HD, ED, PMD, MWA, NGOs |
| 1.6 | <i>Explore opportunities to restore Samoa's endemic biodiversity, held in collections outside of Samoa. Identify outside ex-situ collections holding Samoa's biological and genetic resources, and develop agreements for the restoration and repatriation of ownership rights.</i> | DLSE, MFA, AG, PMD, MYSCA, SVB, NGOs  |

## **Key Players:**



## THEME 6 - Biosecurity

### Key Player:

### **Objective 2: Public Awareness and Education**

To raise awareness and understanding of all Samoan on Access and Benefit Sharing on the Use of Genetic Resources.

#### **Action:**

2.1 *Develop and implement public awareness campaigns on Environment (Bioprospecting) Regulations.*

DLSE, MAFFM, AG, DJ, MIA, DTCl, USP, NUS, MFA, CUS, TSY, HD, ED, PMD, MWA, NGOs, VC

2.2 *Conduct national Seminars involving all key stakeholders on Access and Benefit Sharing programmes on the use of Genetic Resources.*

DLSE, ED, MIA, MWA, NGOs

2.3 *Co-ordinate and implement Media programmes to raise awareness.*

DLSE, BROADCASTINGS, TVS, NEWSPAPERS

## **3.6 THEME 6: BIOSECURITY**

### **Strategy Goal:**

To protect Samoa's native biodiversity from impacts of alien species, through, effective border control, effective quarantine and eradication programmes.

*One of the biggest threat to the long term survival of native biodiversity in small and fragile island environments such as Samoa, is the spread of both intentional and non-intentional introductions of alien species on the native flora and fauna.*

*Recent experiences on the spread of invasive species such as the African Snail, the mint weed, and the taro blight created considerable impact on the economic infrastructure of the country.*

*Less noticeable is the spread of other invasive species which have considerable impact on native biodiversity such as Koster curse, African tulip, and rubber trees, which now dominate secondary growth forest, thus slowing the natural regeneration of native forests after cyclones, forest fires and in particular forest clearance and logging operations.*



## **THEME 6 - Biosecurity**

*Additionally, the possible impacts of genetically modified organisms on the native biodiversity can be drastic if appropriate facilities and well trained personnel are not put in place.*

*With the potential impacts on native biodiversity from alien species, rigorous programmes along with appropriate well equipped facilities and trained staff need to be put in place.*

### **Key Players:**

### **Strategy and Action Plan on the Biosecurity of Samoa's native biodiversity.**

#### **Objective 1: Policy and Legislation**

To develop appropriate policies and legislation to ensure the effective management of biosecurity.

##### **Actions:**

- 1.1 *Establish a co-ordination committee on the protection of indigenous biodiversity from alien introduction.*
- 1.2 *Develop policy and actions for the management of biosafety issues.*
- 1.3 *Review and make appropriate amendments on screening process for alien species introduction to include assessment of impacts on native biodiversity.*

DLSE, MAFFM, NUS, USP, SVB, MFA, DTCl, CUS, PMD

DLSE, AG, MFA, MIA, MAFFM, NGOs

DLSE, MAFFM, MIA, CUS, AG, DTCl, MFA, AIRLINES, SSC, VC, PORT AUTHORITIES

#### **Objective 2: Control and Eradication**

To identify and develop appropriate programmes to ensure effective control and eradication of pest outbreaks.

##### **Actions:**

- 2.1 *Strengthen facilities and procedures for border control and quarantine services.*
- 2.2 *Develop programmes for the eradication and control of priority invasive species; African land snail, mint weed, Koster's curse, night blooming cestrum, cane toad, rattan, and others.*
- 2.3 *Develop a programme for the eradication of rodents from small islands which can be used for the conservation of rare species such as the tuameo.*

DLSE, MAFFM, AG, MIA, CUS, PORT AUTHORITIES, DTCl, MFA, SSC, AIRLINES

DLSE, MAFFM, AG, MIA, CUS, PORT AUTHORITIES, DTCl, MFA, SSC, AIRLINES

DLSE, MAFFM, MIA, HD, VC, NGOs



## **THEME 6 - Biosecurity**

### **Key Players:**

- 2.4 *Implement the PacPOL programme to protect native marine biodiversity through the discharge of ships ballast water.*

DLSE, MAFFM, PORT AUTHORITIES, SSC, DPP, FISHERMEN ASSOCIATION, SAMOA FISH EXPORTERS

### **Objective 3: Research and Monitoring**

To carry out systematic and scientific research based on regular monitoring of the biosecurity management system.

#### **Actions:**

- 3.1 *Review pest species amongst trading partners and develop response procedures for eradication.*

DTCI, CUS, MFA, SSC, FISH ASSOCIATION, FISH EXPORTERS, CHAMBER OF COMMERCE, PRIVATE SECTOR, MAFFM, DLSE, AG, NGOs

- 3.2 *Strengthen national research stations to be able to undertake appropriate scientific research and testing on introduced species.*

MAFFM, NUS, USP, HD, DLSE, MFA, CUS, MIA, NGOs

- 3.3 *Review and update the list of invasive species in Samoa.*

DLSE, MAFFM, DTCI, MIA

- 3.4 *Assess the risks on native biodiversity from recent species introduction such as the myna, bulbul, tamaligi, pulu vao, etc.*

DLSE, MAFFM, USP, NUS

### **Objective 4: Capacity Building**

To strengthen capacity of local staff through the implementation of relevant training programmes to ensure effective border control and quarantine services.

#### **Actions:**

- 4.1 *Provide training and capacity building for local staff on screening of any new species introduction*

DLSE, MAFFM, HD, NUS, USP, PSC, DTCI, CUS, NGOs

- 4.2 *Undertake capacity building training for Quarantine staff on border control and quarantine services*

MAFFM (QUARANTINE SECTION), PSC, DLSE, PORT AUTHORITY, ED



## **THEME 6 - Biosecurity**

## **Key Players:**

### **Objective 5: Public Awareness and Education**

To enhance knowledge and understanding of the public on the importance of protecting and conserving our biodiversity from the impacts of alien species.

#### **Actions:**

- 5.1 *Develop and implement a national public awareness programmes for invasive species to prevent illegal introductions and control.*

MEDIA, DLSE, MAFFM, MFA, AG, CUS

## **3.7 THEME 7: AGROBIODIVERSITY**

### **Strategy Goal:**

The conservation and sustainable use of agrobiodiversity contributes to national development and preservation of traditional knowledge, innovations and practices.

*Agrobiodiversity refers to the variety and variability of animal, plant and microbial organisms on earth that are important to food and agriculture. Traditional Samoan agricultural techniques were used over generations to develop new crops and maximize the use of the natural environment to cultivate relevant species for food production. Such techniques and species have been replaced by hybrids and modern techniques which are largely inappropriate.*

*Agricultural development is amongst the primary source of income for most Samoans. It is also one of the main activities that is contributing to the loss of biodiversity. As an example, the majority of native forest loss in Samoa is caused by agricultural development.*

*The two interests of increase agricultural productions and protection of native biodiversity can be achieved through sustainable agricultural practices such as agroforestry. Promoting sustainable agrobiodiversity practices further ensures the long term protection of traditionally important agricultural practices and breeding methods.*

### **Strategy to conserve and sustainably manage agrobiodiversity.**

### **Objective 1: Conservation and Sustainable Use of Agrobiodiversity**

To ensure the effective implementation of appropriate conservation and sustainable use of agrobiodiversity.





## **THEME 7 - Agrobiodiversity**

### **Key Players:**

#### **Actions:**

- |     |   |   |
|-----|---|---|
| 1.1 | <i>Promote methodologies for sustainable use of Agrobiodiversity.</i>   | MAFFM, USP, DLSE, MIA, ED, NGOs, DTCl, TSY, MWA, SVB, VC          |
| 1.2 | <i>Eliminate unsustainable Agrobiodiversity use.</i>  | MAFFM, NUS, USP, DLSE, MIA, ED, NGOs, DTCl, TSY, MWA, HD, SVB, VC |
| 1.3 | <i>Establish incentives which encourage conservation and sustainable use of Agrobiodiversity.</i>                               | MAFFM, DLSE, MIA, DTCl, TSY, MWA, AG, USP, NUS, VC, SVB, NGOs     |
| 1.4 | <i>Promote environmentally sound agricultural practices such as farming systems, Agroforestry and organic farming.</i>          | MAFFM, DTCl, DBS, DLSE, MIA, VCs, NGOs                            |
| 1.5 | <i>Place greater emphasis on the importance and establishment of botanical gardens.</i>   | MAFFM, DLSE, MIA, MWA, VC, SVB                                    |
| 1.6 | <i>Expand in-situ/ex-situ conservation and sustainable activities, protected areas, aquaculture/mariculture.</i>                | DLSE, MAFFM, NUS, USP, VC, MIA, NGOs                              |
| 1.7 | <i>Develop new and enhance existing programmes for the preservation of traditional species/varieties/breed from extinction.</i> | DLSE, MAFFM, NUS, MIA, MWA, MYSCA, NGOs                           |

### **Objective 2: Research and Development**

To conduct relevant research critical to the development of Agrobiodiversity.

#### **Actions:**

- |     |   |   |
|-----|---|---|
| 2.1 | <i>Develop programmes for the protection of native/useful species and varieties from the impact of alien and invasive species.</i>  | DLSE, MAFFM, USP, NUS, AG, HD, ED, DTCl |
| 2.2 | <i>Assess the impacts of new bio-technologies (genetic expressions, Living or Genetically Modified Organisms and Genetically Engineered Organisms) on Agrobiodiversity.</i> | DLSE, MAFFM, USP, NUS, AG, HD, ED, DTCl |
| 2.3 | <i>Conduct inventories and promote surveys of existing Agrobiodiversity resources.</i>  | DLSE, MAFFM, USP, NUS, MFA, MIA, NGOs   |



## **THEME 7 - Agrobiodiversity**

### **Key Players:**

- |     |  |   |
|-----|--|---|
| 2.4 | <i>Establish herbaria to preserve the native species.</i>  | DLSE, MAFFM, USP, NUS, DTCl, MFA                              |
| 2.5 | <i>Develop new and expand existing markets for local species/varieties and diversity rich products.</i>  | DTCl, MAFFM, HD, NGOs, TSY                                    |
| 2.6 | <i>Document and publish research findings.</i>   | DTCl, NUS, MIA, DLSE, MAFFM, HD, NGOs, TSY                    |
| 2.7 | <i>Develop and implement Code of Conduct/Code of Ethics for carrying out research.</i>   | DLSE, MAFFM, AG, USP, NUS, AG, HD, ED, DTCl, NGOs             |
| 2.9 | <i>Develop and implement research and development training programmes for all relevant institutions involved in Agrobiodiversity programmes.</i> | DLSE, MAFFM, NUS, NGOs, MIA, SVB, VC, TSY, MWA, ED, DTCl, MFA |

### **Objective 3: Food and Health Security**

To fully enhance and strengthen the critical importance of food and health security through the use of sustainable Agrobiodiversity practices.

#### **Actions:**

- |     |  |  |
|-----|--|--|
| 3.1 | <i>Encourage sustainable breeding practices.</i>   | DLSE, MAFFM, AG, USP, NUS, AG, HD, ED, DTCl, NGOs      |
| 3.2 | <i>Develop and implement Agrobiodiversity programmes that not only increase food productivity but also restore and enhance agrobiodiversity.</i> | DLSE, MAFFM, AG, USP, NUS, HD, ED, DTCl, NGOs          |
| 3.3 | <i>Develop new and existing programmes that promote the production of nutritional food.</i>  | DLSE, MAFFM, AG, USP, NUS, HD, ED, NGOs, SWA, MIA, SVB |
| 3.4 | <i>To increase and improve inspection criteria on the quality of both locally produced and imported food.</i>                                    | HD, MAFFM, DTCl, DLSE, CUS                             |

### **Objective 4: Public Awareness and Education**

To raise awareness and understanding of Agrobiodiversity through both formal and informal educational programmes.



## **THEME 8 - Financial Resources & Mechanisms**

### **Key Players:**

#### **Actions:**

- 4.1 *Undertake national awareness programmes through all media, workshops, seminars and utilising the involvement and commitment of communities, on the sustainable use of Agrobiodiversity.*

DLSE, MAFFM, NUS, NGOs, MIA, ED, SVB, VC, MEDIA

### **Objective 5: Capacity Building**

To strengthen human and institutional capacity to ensure the effective implementation of Agrobiodiversity programmes.

#### **Actions:**

- 5.1 *Undertake systematic training to enhance understanding and awareness and also to strengthen public involvement and commitment on Agrobiodiversity practices.*
- 5.2 *Increase collaboration and coordination of the institutions directly involved in Agrobiodiversity programmes.*
- 5.3 *Integrate traditional and modern practices to further improve the Agrobiodiversity of Samoa.*

DLSE, MAFFM, NUS, NGOs, MIA, SVB, VC, TSY, MWA

DLSE, MAFFM, NUS, NGOs, MIA, SVB, VC, TSY, MWA, ED, DTCl, MFA

DLSE, MAFFM, NUS, NGOs, MIA, SVB, VC, TSY, MWA, ED, DTCl, MFA

## **3.8 THEME 8: FINANCIAL RESOURCES & MECHANISMS**

### **Strategy Goal:**

To secure long-term financial sustainability of all Conservation and Biodiversity related programmes by way of access to funding mechanisms from local and international sources.

*Implementing plans and programmes set out by Government, local communities, and non-government organization for the conservation and sustainable use of biodiversity ultimately rely on the availability of the human resources capacity and financial resources. While efforts are being made to increase human resources capacity, implementation hinders on the limited financial resources.*



## **THEME 8 - Financial Resources & Mechanisms**

### **Key Players:**

*To effectively implement conservation and sustainable use programmes, all available avenues need to be identified for which funds could be accessed from, and plans need to be made so such funds are managed effectively.*

*This obligations needs commitment of all stakeholders on the local, national, regional and international level.. Local communities need to recognize the need to allocate financial resources on the local level to ensure sustainability of its biological resources. Government should recognise and further increase its commitment to conserving the vital biodiversity which is fundamental to the social and economic development of the nation.*

*These local and national efforts will not always be able to address all the increase demands made on the biodiversity. Mechanisms therefore should be sought to secure financial assistance from international and bilateral sources.*

### **Strategy for obtaining long term financial sustainability for the conservation and sustainable use of biodiversity**

#### **Objective 1: Financial Plans**

To develop long term Financial Plans for undertaking Conservation Programs.

*Monitoring Goal: Long term financial plan for financing biodiversity work developed.*

#### **Actions:**

- |     |  |   |
|-----|--|---|
| 1.1 | <i>Develop a long-term financial plan for undertaking conservation programmes in Samoa.</i>                                      | DLSE, MAFFM, NUS, NGOs, MIA, SVB, VC, TSY, MWA, ED, DTCl, MFA |
| 1.2 | <i>Establish a programme for increasing financial assistance for conservation work through Foundations and other aid donors.</i> | DLSE, TSY, DTCl, MAFFM, NGOs, MFA                             |
| 1.3 | <i>Coordinate an annual or biannual donors meeting to present biodiversity priorities for funding.</i>                           | DLSE, MFA, TSY, NGOs  |

#### **Objective 2: Conservation Trust Fund**

To establish a Conservation Trust Fund for the implementation of the NBSAP and relevant Biodiversity Work.

#### **Actions:**

- |     |  |                           |
|-----|--|---------------------------|
| 2.1 | <i>Identify funding sources for the establishment of a Conservation Trust Fund to provide long term financial sustainability for the implementation of NBSAP and relevant biodiversity related work.</i> | MFA, DLSE, TSY, NGOs, MFA |
|-----|--|---------------------------|



## **THEME 8 - Financial Resources & Mechanisms**

### **Key Players:**

- 2.2 *Establish a Conservation Trust Fund and provide Guidelines and set Criteria for its use.*
- 2.3 *Explore the feasibility of establishing conservation taxes and permits from the use of Samoa's biodiversity.*
- 2.4 *Develop guidelines for establishing community-based conservation trust funds.*

DLSE, TSY, MFA,  
DTCI, NGOs

DLSE, TSY, FRMS,  
DTCI

DLSE, MAFFM, TSY,  
DIR, AG, NGOs, VCs

### **Objective 3: Economic Valuation**

To undertake an Economic Valuation of Samoa's Biodiversity.

*Report on the economic values of Samoa's biodiversity.*

#### **Actions:**

- 3.1 *Conduct a study on the introduction of user fees for national parks and reserves, to supplement government funding for work in these reserved areas.*
- 3.2 *Institute environmental economic valuation methodologies for assessing the full economic value of biodiversity.*
- 3.3 *All user fees, taxes, fines and other revenues determined in the economic valuation should be deposited in the Conservation Trust Fund.*
- 3.4 *Integrate biodiversity valuation as an integral part of land use and coastal use planning.*

DLSE, DIR, TSY,  
MAFFM, MIA, VCs,  
NGOs

DLSE, TSY, FRMS,  
MAFFM, DTICI, SVB,  
STATISTICS, CB

DLSE, DIR, TYS,  
MAFFM, FRMS, MIA,  
NGOs

DLSE, PWD, MAFFM,  
TSY, MIA, VC, NGOs

### **Objective 4: Information Systems**

To establish Information Systems of all Potential Donor Assistance.

*Number of donors on the national biodiversity database.*

#### **Actions:**

- 4.1 *Establish and regularly update a database of all potential donor assistance programs.*
- 4.2 *Develop a mechanism to determine different funding sources channeled to NGO's for implementation of Biodiversity related programs.*
- 4.3 *Maintain and strengthen existing networks with donor agencies.*

DLSE, TSY, MFA,  
MAFFM, NGOs

DLSE, MFA, MAFFM,  
MIA, NGOs

MFA, DLSE, NGOs, TSY,  
DTICI



## **THEME 8 - Financial Resources & Mechanisms**

### **Key Players:**

#### **Objective 5: Income Generating Activities**

To identify and promote sustainable Income Generating Activities for the community.

*Monitoring Goal: Number of income generating started in conjunction with conservation and sustainable use initiatives.*

##### **Actions:**

5.1 *Identify and develop appropriate programs to promote sustainable income generating activities at the community level.*

DLSE, MFA, NGOs

5.2 *Establish a network with public and private sectors including donor agencies to support Income Generating Activities.*

MFA, DLSE, MAFFM, TSY, DTCl, NGOs

5.3 *Conduct feasibility studies for newly proposed Income Generating Activities.*

DLSE, MIA, MAFFM, MWA, MYSCA, SBEC, NGOs

5.4 *Establish and update a database to record all Income Generating Activities implemented locally.*

DLSE, DTCl, MAFFM, MIA, MWA, MFA, SBEC, TSY, NGOs

#### **Objective 6: Partnership**

To strengthen the Partnership with the Private Sector, NGOs, and Local Communities.

*Monitoring Goal: Number of partnerships for conservation between private sector, Government, NGOs and Local Communities.*

##### **Actions:**

6.1 *Develop and implement programs to strengthen the partnership with the private sector, NGO's and local community in implementing Biodiversity related programs.*

DLSE, TSY, MIA, MWA, MFA, ED, HD, NGOs, VC

6.2 *Establish a special award for an environmentally friendly company to be integrated in the Exporter of the Year Award programme.*

DLSE, DTCl, TSY

6.3 *Establish an award program for environmentally friendly community development.*

DLSE, DTCl, FRMS, TSY

#### **Objective 7: Accounting System**



## **THEME 8 - Financial Resources & Mechanisms**

### **Key Players:**

To establish an Accounting System for recording revenues and expenditures for Biodiversity related activities.

*Monitoring Goal: Number of agencies and projects with accounting systems to record revenues and expenditures for biodiversity related activities.*

#### **Actions:**

- |     |  |                               |
|-----|--|-------------------------------|
| 7.1 | <i>Set up a network with relevant Biodiversity agencies for recording revenues and expenditures for Biodiversity related activities.</i> | DLSE, TSY, DTCl,<br>FRMS, DIR |
| 7.2 | <i>Produce Quarterly Progress Reports (including financial statements) for each Biodiversity project.</i>                                | DLSE, TSY, MAFFM,<br>MIA, VC  |
| 7.3 | <i>Establish mechanisms for the establishment of national green accounting in Samoa.</i>   | DLSE, TSY, MAFFM,<br>CBS      |

### **Objective 8: Capacity Building**

To strengthen the local capacity in the coordination and implementation of Biodiversity and Conservation Projects.

#### **Actions:**

- |     |  |  |
|-----|--|--|
| 8.1 | <i>Identify existing capacity development needs in addressing biodiversity and conservation related programs.</i>                                | DLSE, MIA, MAFFM,<br>MYSCA, MWA, SVB,<br>NUS, NGOs |
| 8.2 | <i>Secure financial assistance to develop and implement capacity development programs.</i>   | MFA, DLSE, TSY                                     |
| 8.3 | <i>Develop capacity building programs to improve financial management planning and implementation of Biodiversity and Conservation projects.</i> | DLSE, MAFFM, MIA,<br>SBEC, MFA, TSY, PSC,<br>NGOs  |

### **Objective 9: Public Awareness**

To raise public awareness of existing and potential financial resources.

#### **Actions:**

- |     |   |                                     |
|-----|---|-------------------------------------|
| 9.1 | <i>Publish and disseminate as widely as possible information on funding mechanisms.</i> | DLSE, MFA, TSY, DTCl,<br>MAFFM, NGO |
|-----|---|-------------------------------------|





## **THEME 8 - Financial Resources & Mechanisms**

### **Note:**

*It is anticipated that the international community, which includes donor agencies and relevant regional organizations will be approached for financial assistance to facilitate the full implementation of the activities of NBSAP.*



*Sign Board : Pupu Pu'e National Parks*



## 4. IMPLEMENTATION AND MONITORING

### 4.1 MANAGEMENT STRUCTURE FOR IMPLEMENTING THE STRATEGY

#### A. Current Situation:

The current administrative framework identifies the Division of Environment and Conservation as the main implementing agency for biodiversity work in Samoa as defined in the Lands and Environment Act 1989. The current Lands and Environment Act 1989 is in the process of review with a proposed Environment Bill draft being discussed. The proposed Environment Bill integrates the formulation of an Environment Board which will oversee the inter-agency collaboration on the management of all environmental work in Samoa.


The NEMS developed through a multi-sectoral team of government agencies, non-government organizations and statutory bodies established the framework for the formulation of inter-agency committees to develop environmental policies such as biodiversity and advise on the management of such policies. The basis of the current NBSAP Steering committee is formed from the Biodiversity Policy Committee identified in the NEMS.

#### D. Biodiversity Steering Committee:

Based on the management structure in the Lands And Environment Act 1989, and the NEMS, the management and implementation of the NBSAP is therefore proposed to follow this structure until such a time when the new arrangements are made. It is recommended that the current NBSAP Steering Committee which also acts as the Biodiversity Policy Committee should form the basis of a 'Biodiversity Steering Committee' (BSC), chaired by the Division of Environment and Conservation to monitor the NBSAP implementation and advise on the future of biodiversity work in Samoa. The only addition should be that of more representation of the private sector.

It is recommended that the members of the BSC be as follows:

NATIONAL BIODIVERSITY STEERING COMMITTEE	
<b>Government Agencies:</b>	<b>Non-Government Organisations:</b>
1. DLSE	1. SUNGO
· DEC	2. FSS
· LAND BOARD	3. OLSS
· NATIONAL PLANNING DIVISION	4. TSA
2. MAFFM	5. WDC
· DIVISION OF FORESTRY	6. NCW
· DIVISION OF AGRICULTURE	7. METI
· DIVISION OF LIVESTOCK	
· DIVISION OF FISHERIES	<b>Private Sector:</b>
3. MWA	1. WBD
4. MIA	2. CHAMBER OF COMMERCE
5. DTCI	
6. MFA	<b>Statutory Bodies:</b>
7. TSY	1. SVB
8. AGM	2. SWA
9. HD	3. MUSEUM



The BSC should function in the same manner as it does now, i.e. to bring together the key stakeholders to contribute to the implementation of the NBSAP and advice on the associated biodiversity management programmes.

Functions of the BSC:

- To identify priority actions in the NBSAP that will be submitted for donor assistance
- To identify actions that can be taken up locally
- To identify lead agencies and ensure collaborations between agencies on the implementation of specific actions identified in the NBSAP
- Monitor and recommend appropriate actions regarding the implementation of the NBSAP
- Discuss and make appropriate recommendations on Samoa's national positions to regional and international biodiversity meetings
- Facilitate the dissemination of biodiversity related materials to all stakeholders for appropriate actions
- Coordinate and ensure multi-sectoral collaboration for all biodiversity work.
- Maintain and update a listing of biodiversity work being undertaken in Samoa
- Assist members of expert groups in performing specific tasks
- Develop an monitoring program to assess the effectiveness of the NBSAP in managing Samoa's biodiversity.

The BSC will be purely a facilitator and will not have a managerial or administrative function.

### **C. Expert Groups:**

Implementation of the Samoan NBSAP requires the best available and factual scientific information. To generate information and recommend advise on appropriate actions for specific areas, such as biosafety, access to genetic resources, traditional knowledge, marine biodiversity and invasive species, specific expert groups will be required to be established. Membership of such expert groups should be based on recommendations of the DEC as the main biodiversity implementing agency and the Biodiversity Steering Committee.

### **D. National Biodiversity Database:**

To facilitate the collection and storage of biodiversity information for effective management programmes, it is recommended that the current biodiversity database housed within the DEC should be utilised for such purposes.

To function effectively, it is recommended that all relevant information collected or researched about Samoa's biological and genetic resources, geographic information systems maps on topography and land use of the islands, biodiversity related projects, and associated information as identified in the actions should be deposited at the national biodiversity database. Information form such a database should than be used for future development or conservation planning programmes.

### **E. National Clearinghouse Mechanism:**

To ensure the continual access of government agencies, statutory bodies, non-government organizations, local communities and private sector to the best available information on the management of biodiversity, a formal clearinghouse mechanisms needs to be established.



This mechanism should be developed in the form of a national biodiversity database to store the information but also enable the dissemination to the general public. To ensure this, the national biodiversity database needs to be redeveloped. All agencies and organizations working in biodiversity should be required to deposit information into the database. A web-based discussion line and newsletter are suggested to be incorporated as part of the National CHM to ensure regular updates for all stakeholders.

#### **F. Regional and International Linkages:**

In recognizing the need to work with Pacific neighbors and the international community on advancing the conservation and sustainable use of biological and genetic resources, strong linkages must be made with regional and international organizations and expert groups, which can provide a useful expertise and advice when not available locally. To assist with the implementation of the NBSAP, Samoa must therefore identify all regional and international groupings which can provide advice or assist in the implementation of national actions.

### **4.2 MONITORING:**

To ensure the actions identified in the plan and the consequent implementation of the NBSAP are producing useful results, it is important to assess if such actions are making a change towards meeting the goals and objectives of the NBSAP.

To make sound and accurate decisions on future biodiversity work, the following monitoring program anticipates to be used in reviewing the implementation and more importantly, to track any changes in the status of biological resources.

The monitoring when agreed should include mostly information generated for the national biodiversity database, while some additional information will have to be obtained from other forms such as field surveys, and input from the Biodiversity Steering Committee.

The monitoring program will be the main responsibility of the DEC with assistance provided through agencies and organizations present in the Biodiversity Steering committee.

Attached is the proposed monitoring matrix which can be discussed or refined by the Steering committee.

### **4.3 REPORTING:**

The steering committee needs to decide on how to make the reporting of the NBSAP implementation.

It can consider reporting on the two mechanisms defined in the implementation plan. This is to

- 5 have reporting on the implementation of certain actions of the NBSAP to the steering committee annually or every time the BSC meets
- 6 and report on the monitoring matrix to assess if the implementation is making a change on the quality of the biodiversity.

Adjustments and recommendations would therefore follow from those identified in the reports.



**TABLE 4.1: NBSAPS IMPLEMENTATION MONITORING MATRIX**

<b>NBSAP Vision</b>		Samoa's biological and genetic resources is protected, conserved and sustainably managed so that it will continue to flourish and regenerate, for present and future generations.	
<b>Strategic Objective 1. Biodiversity Management :</b> To minimise the impacts on the native biodiversity while conserving them for present and future generations.			
<b>INTENDED OUTCOMES</b>	<b>INDICATORS</b> (measured every 2 years unless otherwise indicated)	<b>MEANS OF MEASUREMENT</b>	<b>ASSUMPTIONS</b>
1.1 The threats to biodiversity are prevented, eliminated or reduced	1.1.1 No. of programs in place to prevent, eliminate or reduce threats to biodiversity.	<ul style="list-style-type: none"> <li>▫ National biodiversity database update</li> <li>▫ Ministry corporate and work plans</li> </ul>	<ul style="list-style-type: none"> <li>▫ plans, policies and programs will be the first indicators of government action</li> </ul>
	1.1.2 Change in coverage of native biodiversity incidence and severity of threats (invasive species, land clearing, coral reef destruction).	<ul style="list-style-type: none"> <li>▫ GIS maps of land and coastal use changes</li> <li>▫ Complaints on biodiversity destruction</li> <li>▫ National biodiversity database</li> </ul>	<ul style="list-style-type: none"> <li>▫ Reduction on alterations to native biodiversity can provide a snapshot on the health of ecosystems</li> </ul>
	1.1.3 Change in incidence and severity of most urgent threats.	<ul style="list-style-type: none"> <li>▫ NBASP or other national reporting</li> </ul>	<ul style="list-style-type: none"> <li>▫ An increase in peoples awareness of the benefits acquired from the reduction of threats to the biodiversity can alter their adverse environment activities.</li> </ul>
1.2 Species, habitats and ecosystem processes are maintained or restored	1.2.1 Change in status of species populations.	<ul style="list-style-type: none"> <li>▫ Biodiversity monitoring program results</li> <li>▫ National biodiversity database</li> <li>▫ CA and protected areas monitoring programmes</li> </ul>	<ul style="list-style-type: none"> <li>▫ An increase in specie populations will indicate peoples favourable impact on species regeneration.</li> </ul>
	1.2.2 a. No. type, year established, size of conservation and protected areas. b. No. of CAs with effective management in place.	<ul style="list-style-type: none"> <li>▫ National biodiversity database</li> </ul>	<ul style="list-style-type: none"> <li>▫ Protected and Conservation Areas provide the best means for reasonable regeneration of species populations.</li> </ul>
	1.2.3 a. Types of habitats and species protected in conservation areas, % of PI biodiversity represented. b. Change in health and integrity of key ecosystem types using existing data and rapid assessment tools (eg. ReefCheck, BSAP inventories, remote sensing).	<ul style="list-style-type: none"> <li>▫ National biodiversity database</li> <li>▫ CA reports</li> </ul>	<ul style="list-style-type: none"> <li>▫ Will sample biodiversity using a small number of key ecosystem types.</li> <li>▫ change should not be a reflection of increased information on existing sites but sites newly established during the life of the Action Strategy</li> </ul>



### Strategic Objective 2. Mainstreaming Biodiversity:

To integrate conservation and sustainable use of biodiversity into all relevant sectoral policies, programmes and plans.

INTENDED OUTCOMES	INDICATORS (measured every 2 years unless otherwise indicated)	MEANS OF MEASUREMENT	ASSUMPTIONS
2.1 Government legislation policies and programs integrate conservation and sustainable use of biodiversity.	2.1.1 No. of national and sectoral plans, policies and legislation that specifically integrate conservation and sustainable use of biodiversity	▫ National biodiversity database	▫ Not all legislation, policies and programmes integrate conservation and sustainable use of biodiversity
	2.1.2 number of project and programmes implemented by Government agencies integrating conservation and sustainable use of biodiversity	▫ National biodiversity database	▫ not all projects integrated conservation and sustainable use of biodiversity
	2.1.3 The NBSAP is recognized as a priority issue for implementation in the SES	▫ SES report	▫ More support for biodiversity implementation will happen if it is recognized as a national priority
	2.1.4 EIA regulations have been introduced and utilized to minimize the impact of development on the biodiversity	▫ EIA regulations	▫ EIA regulations will minimize detrimental impacts on biodiversity

### Strategic Objective 3. Community:

Empowering and encouraging traditional communities to protect, conserve and sustainably use and manage our biodiversity.

INTENDED OUTCOMES	INDICATORS (measured every 2 years unless otherwise indicated)	MEANS OF MEASUREMENT	ASSUMPTIONS
3.1 Local communities and resource owners manage their resources cooperatively for conservation and sustainable development.	3.1.1 No. of community-based conservation areas and conservation initiatives in place 3.1.2 No. of community empowerment trainings completed	▫ MIA reporting, DEC reporting	▫ <b>Most communities act upon greater understanding of the benefits from conservation and sustainable use of biodiversity</b>
3.2 Greater participation and representation of local communities in the development and implementation of natural resource plan	3.2.1 No. of national and sector plans and development projects a. that were developed and implemented with community participation; b. that recognize the rights of communities and customary owners; c. that provide for cooperative management of natural resources with communities and customary owners	▫ Steering committee reporting ▫ National biodiversity database	▫ Local communities understanding and participation in planning process will contribute to balanced implementation



**Strategic Objective 4 Access and Benefit Sharing from the Use of Genetic Resources:**

Samoa's genetic resources are accessible for utilisation and benefits derived are equitably shared among the stakeholders.

INTENDED OUTCOMES	INDICATORS (measured every 2 years unless otherwise indicated)	MEANS OF MEASUREMENT	ASSUMPTIONS
4.1 National measures for access and benefit sharing from the use of genetic resources established	4.1.1 Legislations and policy formulated to facilitate access and benefit sharing measures.	<ul style="list-style-type: none"> <li>▫ National biodiversity database</li> </ul>	<ul style="list-style-type: none"> <li>▫ Establishment of national measures will reduce incidences of biopiracy</li> </ul>

**Strategic Objective 5. Biosecurity:**

To protect Samoa's native biodiversity from impacts of alien species, through, effective border control, effective quarantine and eradication programmes.

INTENDED OUTCOMES	INDICATORS (measured every 2 years unless otherwise indicated)	MEANS OF MEASUREMENT	ASSUMPTIONS
5.1 Appropriate policies and legislation to ensure the effective management of biosecurity established.	5.2.1 Biosecurity legislations, policies and plans established.	<ul style="list-style-type: none"> <li>▫ Legislation</li> <li>▫ National biodiversity database</li> </ul>	<ul style="list-style-type: none"> <li>▫ Effective National measures will control the introduction and spread of alien invasives.</li> </ul>
5.2 Local capacity build to control impacts of alien invasive species introduction.	5.2.2 Training programmes and projects undertaken to control and eradicate alien introductions.	<ul style="list-style-type: none"> <li>▫ DEC and MAFFM work plans</li> <li>▫ National biodiversity databased</li> </ul>	<ul style="list-style-type: none"> <li>▫ Well trained and equipped agencies will reduce the risk of spread of alien species.</li> </ul>





**Strategic Objective 6. Financial Sustainability:**

To develop local, national, regional and international sources of funding to achieve conservation and sustainable management of natural resources while securing long term support from multilateral and bilateral donors; and to develop and advocate appropriate new funding mechanisms.

<b>INTENDED OUTCOMES</b>	<b>INDICATORS</b> (measured every 2 years unless otherwise indicated)	<b>MEANS OF MEASUREMENT</b>	<b>ASSUMPTIONS</b>
6.1 Increased funding from local and national sources	6.1.1 Total local funding, % of total and no. of donors from local and national sources to support environment agencies conservation sites, programs and national NGOs  6.1.2 *National Government Expenditure: expenditure for conservation and natural resource management activities (environment, fisheries, forestry in agencies, national budgets; extent to which these expenditure are differentiated in agencies/national budgets.	<ul style="list-style-type: none"> <li>▫ National biodiversity database with information provided by NGO community, Treasury Dept., MFA, and DEC.</li> <li>▫ Treasury Department</li> </ul>	<ul style="list-style-type: none"> <li>▫ diversity of sources will increase financial sustainability.</li> <li>▫ total local/ national financing of conservation programmes in Samoa is not feasible, and continued donor support will be essential.</li> </ul>
6.2 Increased commitment by international community to financing NBSAP implementation	6.2.1 Total international (multilateral/ bilateral/ NGO) funding for conservation/natural resource management programs. 6.2.2 No. of international funding commitments or programs (including phased programs/ projects of >5yrs to conservation/natural resource management program	<ul style="list-style-type: none"> <li>▫ MFA, DEC, NGO community</li> </ul>	<ul style="list-style-type: none"> <li>▫ The International Community is committed to supporting favourable efforts towards biodiversity conservation at the grassroots.</li> </ul>
6.3 Developed new conservation funding mechanisms (short- and long-term)	6.3.1 No., type and level of new conservation funding mechanisms in process or established	<ul style="list-style-type: none"> <li>▫ National biodiversity database</li> </ul>	<ul style="list-style-type: none"> <li>▫ Limited knowledge and experience in developing new financing mechanisms.</li> </ul>



## **5. APPENDICES**

### **5.1 REVIEW OF SAMOA'S BIODIVERSITY**

#### **5.1.1 INTRODUCTION**

The islands and islets that make up Samoa (formerly known as Western Samoa) are part of a chain of volcanic origin stretching west to south east from Savaii to Rose Atoll, American Samoa. There are thought to have been formed by a series of volcanic eruptions, with the oldest rocks being 2 –3 million years old. They were isolated from other island groups by c750km and from the larger land-masses of South-East Asia by over 5000km. The biodiversity found here reflects a combination of factors – the isolation from other land – species gradient from W to E – the relatively large size of main islands of Upolu (112,147 ha) and Savaii (171,458 ha) providing large potential range of niches – time since species first arrived – ongoing natural disturbances (e.g. eruptions – caused local extinctions and separation.

The first people probably arrived 3000-4000 years ago. Writings of the early explorers e.g. Bougainville [1766-1769] suggest that for over three millennia they lived in harmony with the environment in a largely forested landscape. However, as Park et al. (1993) record 'only faint traces of that Samoa remain today'. Habitat and species loss associated with the demands of an increasing population with modern resources at their disposal, and the arrival of new species, have combined to give us the biodiversity of Samoa today. It remains a biodiversity as distinctive as the culture of its people, a key backbone of Samoa as a nation and at the heart of its sustainable future.

The biodiversity of Samoa faces a crisis, one recognised by its leaders and shared throughout the Pacific. Options for its conservation are limited, particularly in lowland areas where most of the people live, and timing is running out. However this strategy is founded on the belief that enough remains to be built on, so that the natural world of Samoa can recover to once more contribute to the great beauty of these islands, to provide its people with resources on a sustainable basis and play its part in the conserving of the planet's living resources.

#### **5.1.2 SAMOA'S BIODIVERSITY IN A GLOBAL CONTEXT**

The biodiversity of Samoa is particularly important in the context of the South Pacific. A review of the conservation value of a total of 226 South Pacific Islands (Dahl, 1986) ranked three of the islands of Samoa highly, Savaii at number 23, the Aleipata Islands number 30 and Upolu number 46. The South Pacific Biodiversity Conservation Programme recognises Samoa as one of five countries participating in the programme that are particularly important for their wealth of biodiversity (SPREP, 1993). The flora is one of the most diverse in Polynesia with about a quarter of the plants endemic, i.e. found only there. The importance of the country's birdlife, particularly the proportion of endemic species (23%), and the threats to it have been recognised by the International Council for Bird Preservation who have listed the Samoan Islands as one of the world's 'Endemic Bird Areas' in need of 'urgent' conservation attention (ICBP, 1992).

#### **5.1.3 CURRENT STATUS OF SAMOA'S BIODIVERSITY**

##### **5.1.3.1 Terrestrial:**



## A. PLANTS

There have been nearly 500 species of native flowering plants and about 220 species of ferns in 96 families and 298 genera identified in Samoa, making this one of the most diverse floras in Polynesia (Whistler, 1992). Overall about 25% of the plant species are endemic to Samoa and 32% endemic to the Samoan archipelago. There is one endemic genus, *Sarcopygme* (Rubiaceae) with two species.

Whistler (1992) listed 136 native plant species that were considered threatened or endangered. Eighteen of these were found in sufficient numbers during a recent upland survey (Schuster et al., 1999) to be removed from the list, but a large number thus still remain. Four new species for Samoa were found during the same survey so the native flora is probably still incomplete.

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 about 10,000 years ago. While some of these plants are beneficial for agriculture, others have become destructive weeds. Ten weed species were identified during the upland survey as having the potential for serious damage there (Schuster et al., op. cit.).

## B. VEGETATION

Whistler (1992) divided the vegetation into 19 plant communities in five broad categories: littoral vegetation, wetland vegetation, rainforest, volcanic scrub and disturbed vegetation, as follows:

Littoral vegetation: four communities of vegetation situated on the seashore were recognised and much of these types have been lost or degraded. The best remaining examples are at Aleipata Islands, O Le Pupu-Pue and sites on the south (central) coast of Savaii.

Wetland vegetation: four communities are recognised: coastal marsh, montane marsh, mangrove scrub/forest and swamp forest. There have been very serious losses of wetlands, particularly in the lowlands, and only a few intact areas of each type remain (Whistler, op. cit.).

Rainforest: four communities are recognised on an altitudinal gradient: coastal, lowland, montane and cloud forest (restricted to Savaii). The few remaining significant areas of coastal forest are at the Aleipata Islands, Apolima and possibly Tafua Crater. 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 forest (above c. 1000m) areas were mapped by Pearsall & Whistler (1991) and surveyed by Schuster et al. (1999). The former is 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 at 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. Two other potentially significant areas could not be surveyed.

Volcanic vegetation: two communities, lowland volcanic scrub and upland volcanic scrub, are recognised and these occur only on recent lava flows on Savaii.

Disturbed vegetation: four communities derived from a combination of human activities and weather are recognised: managed land, secondary scrub, secondary forest and fernlands.

## C. MAMMALS



There are 13 species of terrestrial mammal now present in Samoa and of these only three are native, two flying foxes (or fruit bats), the Samoan Flying-fox (*Pteropus s. samoensis*) and the Tongan or White-necked Flying-fox (*P. tonganus*), and a small insectivorous bat, the Sheath-tailed Bat (*Emballonura semicaudata*). The flying foxes are important for the long-term survival of the forests for it has been estimated that almost one in three Samoan forest trees depend on bats in some way (Mickleburgh et al., 1993), principally as pollinators or seed dispersers.

The two fruit bats have suffered a dramatic decline this century as a result of forest clearance, hunting for trade and local consumption and the two recent cyclones. Between 1981 and 1988, more than 33,341 fruit bats were exported to Guam (Mickleburgh et al. 1993). This trade was banned by legislation in 1989 but some illegal smuggling has been detected since then. The Samoan flying fox (found only in Western and American Samoa) is currently listed in the global action plan for this group as a Priority Grade 1 species, being endangered and of limited distribution (Mickleburgh et al. op. cit.). Repeat daytime surveys have documented a decline, particularly following Cyclones Ofa and Val in 1990/91 and a slight recovery since (c.f. 134 in 1986, 45 in 1989 (Wilson & Engbring, 1992), 11 in 1993 and 17 in 1995 (Brooke, 1995)).

Little data exists for the Tongan flying fox because it roosts in large colonies and is mostly active at night. Some roosts were destroyed by the cyclones when numbers would have fallen dramatically. Six roosts were recorded during the recent survey of upland forests (Schuster et al. 1999), three other large roosts are known on Upolu - 1860 bats were counted at one in the Aleipata District in August 1995 - and casual observations suggest a continuing recovery.

The sheath-tailed bat was also severely affected by the cyclones and is currently considered probably functionally extinct in Samoa (i.e. a few individuals still present but enough to sustain a population). Only two caves holding bats have been found in the past eight years, despite a local scientist visiting over 20 (Tarburton, M. pers. comm.), and a total of only 7 or 8 individuals seen in these. Recent repeat visits located only a single bat in one of the caves. No sheath-tailed bats were located during the upland survey (Schuster et al., op. cit.). They may also be extinct in American Samoa.

Of the introduced species, the early Polynesian voyagers brought the Polynesian rat (*Rattus exulans*), pigs and dogs to the islands. Cattle, horses, goats, cats, two more species of rats (*Rattus norvegicus* and *R. rattus*) and the house mouse (*Mus musculus*) arrived with Europeans. Damage from the rooting of pigs can be encountered at any altitude in the forests. The distribution and status of the rodents is poorly known, but overseas experience suggests that they will be having a very damaging effect on native fauna and flora. Feral cats are likely to be a problem for birds and lizards in areas where they occur.

#### D. BIRDS

Thirty-five species of land birds and 21 sea and shore birds have been recorded in recent times in Samoa. (The sub-fossil bird fauna has not been investigated.) Eight of the land birds are endemic (there are an additional six endemic sub-species) while four species have been introduced, the most recent being the Common Myna (*Acridotheres trisis*), released in Apia in the late 1960's and spreading through cultivated areas on Upolu.

One native species the Samoan Wood Rail (*Pareudiastes pacificus*) is considered extinct with the last confirmed sighting last century, though a population may persist on upland Savaii where one was possibly seen more recently (Bellingham and Davis, 1988) in an area that could not be visited in the upland survey. The Samoan storm-petrel, a dark form of the white-throated storm petrel (*Nesofregatta*



*albigularis*), has only been recorded as a single specimen in recent years.

Fourteen species were listed as “rare or endangered” in 1980 (Dahl, 1980), prior to two devastating cyclones in 1990 and 1991 which must have significantly reduced their numbers further. However the upland survey (Schuster et al., 1999) and monitoring counts done by the DEC showed all to still be present and most to be increasing in number, albeit slowly. The Samoan Ground Dove or Tuameo (*Gallicolumba stairii*) is of most concern, apparently almost extinct on the two main islands and found only on two small offshore ones. Only a single White-browed Crake (*Poliolimnas cinereus*) and no Sooty Rail (*Porzana tabuensis*) have been recorded in the last few years though this may reflect their inconspicuousness rather than status. Samoa’s most famous species, the Tooth-billed Pigeon or Manumea (*Didunculus strigirostris*) is still encountered in reasonable numbers in some upland forest areas, recorded at 10 of the 13 upland survey sites. The Ma’oma’o (*Gymnomyza samoensis*) was located in only very small numbers at 6 sites in the upland survey and may be under threat.

The breeding seabird fauna is poorly known with only 9 species confirmed breeding compared to over 20 in American Samoa. The difference is largely made up of terns and burrowing shearwaters and petrels and further work is needed to determine which nest here.

A range of wading birds visit Samoa on migration and several new species have been added to the list in recent years and more are likely to be recorded.

#### E. REPTILES

Fourteen species of lizards and 1 snake (Pacific Boa (*Candoia bibroni*)) have been recorded in Samoa. Most of the lizards appear fairly abundant and only one, the Samoan Skink (*Emoia samoensis*) is endemic to the Samoan archipelago.

#### F. INVERTEBRATES

A checklist and bibliography recently produced by the Bishop Museum, Hawaii (Kami & Miller, 1999) listed 2,523 species of insect for the Samoan Islands and 251 species of other arthropods. The groups with most species were the Lepidoptera (moths and butterflies) with 548 species, Coleoptera (beetles) - 536 species and Diptera (flies) - 472 species. It anticipated that more species than this exist and new unreported specimens are held at the Bishop Museum and Landcare Research, New Zealand. The residency status of each species (endemic, indigenous or alien) was not identified in this report, nor is there any information on conservation status.

Recent information on a few invertebrate groups is added below. Where detailed studies have been carried out a high degree of endemism has generally been found.

##### i) Land snails:

Land snails have undergone an extensive radiation throughout the islands of the Pacific (Cowie, 1992). While the land snail fauna of Samoa is still relatively poorly studied in comparison to that of American Samoa, there are more than 20 species known here including four post-European introductions. Recent collecting work by DEC in lowland and upland forests is currently being analysed. The Samoan archipelago holds 19 endemic species, two endodontids, nine charopids and eight partulids. One endodontid species, (*Thaumatodon hystrellicoides*), is listed as threatened and five of the eight partulids are known to occur here



(*Eua expansa*, *E. montana*) (*Samoana stevensonia*, *S. canalis* and *S. conica*) though their present status is uncertain.

**ii) Ants:**

Ants of this region have been of interest to ecologists because the native species on each island have been joined by as many new species introduced by human activity, causing considerable competition between the different species. In their report on the ants of Polynesia, Wilson and Taylor (1967) list 59 species for Samoa of which 12 were endemic. 78 species are listed for the Samoan Islands by Kami & Miller, 1998. Introduced ants are implicated in local extinction of land snails and several snail species are now considered to be restricted to higher altitudes as a result (Pearsall, 1992).

**ii) Butterflies & Moths (Lepidoptera):**

Samoa has 21 species of butterflies all of which are shared with other islands, but two are endemic to the Samoan Group as a whole. These are the Swallowtail (*Papilio godeffroyi*) which is considered threatened and the more common (*Hypolimnys thompsoni*).

As an indication of the degree of endemism in the moths, 57% of 109 species collected during a brief survey in O Le Pupu Pue National Park were endemic.

**5.1.3.2 Freshwater:**

**A. FISH**

There has not been a detailed study of the native freshwater fish fauna. Brief surveys conducted as part of Environmental Impact Assessments of the Afulilo Hydroelectric Power Project (Winders et al. (1987), Waugh et al (1991)) noted a relatively sparse fish and insect fauna with some very common crustacea. A study of wetlands in American Samoa identified 17 species of finfish and eight species of crustacea (Biosystems, 1992) and most of these may occur in Samoa.

In recent years four species have been introduced to Samoa: Mosquito Fish (*Gambusia* spp.) and Topminnows (*Poecilia mexicana*) were introduced early this century for mosquito control purposes; Goldfish (*Carassius auratus*) have an established population in the crater Lake Lanotoo; and African Tilapia (*Oreochromis mombassica*) were originally introduced for aquaculture as a tuna bait fish and have now established populations in most bodies of freshwater. The last has largely now been replaced in aquaculture by the Israeli Tilapia (*Oreochromis niloticus*) considered a more acceptable species.

**B. INVERTEBRATES**

No comprehensive survey has been carried out. During the Afulilo EIA (Waugh et al, 1991) one short-clawed crayfish collected from a site below the falls had not been found elsewhere in Upolu and its taxonomy is unknown, indicating the need for more work on this group. A consultant interested in bio-monitoring recently (August 1995) collected freshwater invertebrates from catchments near Apia and his results may be available soon.

**5.1.3.3 Marine:**

**A. ALGAE**





A compilation of algae from Samoa and American Samoa by Skelton and South (1999) listed 198 taxa, comprising 15 Cyanophyceae, 89 Rhodophyceae, 33 Phaeophyceae and 61 Chlorophyceae. This represents about 50 – 60 percent of the potential algal flora from Samoa (Skelton & South 1999). Furthermore, Skelton (2000) recorded 89 new records in floristic study of Palolo Deep Marine Reserve bringing a total of 287 algae species known in Samoa (Skelton 2000), and preliminary results reveal a total of 128 species of which 89 are new records. Four new red algae species have been recognised from Palolo Deep and these are: *Amansia paloloensis*, *Ceramium upolense*, *Ceramium kramerii* and *Cermium rintelsianum* (South & Skelton 1999; 2000).

Three types of algae are used for consumption and these are *Caulerpa racemosa*, *Caulerpa sp.* (both known locally as limu fuafua), and *Halymenia durvillei* (limu aau). Two seaweeds *Kappaphycus alvarezii* and *Kappaphycus denticulatum* (Bell and Ropeti, 1995) were introduced for aquacultural purposes but did not become established in Samoa.

## B. CORALS

Morton et al. (1988) gives a checklist for corals of Upolu island. Fourteen families are represented with at least 45 species. A comparison with SPREP's survey of Vava'u, Tonga's northernmost raised coral island only about 300 km south of Samoa would probably help identify further species. A similar survey of six village reef corals (two Savaii, one Manono, as well as three Upolu) is planned with Canadian assistance (Mulipola Tony, pers. commun.) Of the families in the checklist, Acroporiidae has the greatest number of species (12) including *Acropora samoense*. In addition, Faviidae and Agaricidae each have six species in five and four genera, respectively. Four families have only a single species (*Euphyllia*, *Turbinaria*, *Merulinia*, *Psammocora*), and a further three families (Fungiidae, Mussidae, Pectiniidae) only a single species in each of two genera. Two families have two species in a single genus (*Millepora* and *Galaxea*), and one has three species of *Porites*. A final family has four species, three in its main genus *Pocillopora*.

## C. MAMMALS

Several whale species and one dolphin, the spinner dolphin (*Stenella longirostris*), have been recorded in Samoan waters, though specific surveys have not been carried out. The Humpback Whale (*Megaptera novaengliae*) is believed to breed here and the Sperm Whale (*Physeter catadon*) may do so. The only recent whale sightings have been of the Humpback in the months August-October.

## D. REPTILES - TURTLES

Two species of sea turtle, the green turtle (*Chelonia mydas*) and the hawksbill (*Eretmochelys imbricata*) inhabit the seas off Samoa and the latter breeds in small numbers on the Aleipata Islands (principally Nuutele and Nuulua) and a few beaches in Savaii. Between 1971 and 1993 the Fisheries Division operated a 'headstarting' programme for hawksbill turtles using eggs taken from the Aleipata Islands, hatching over 20,000 eggs and releasing most hatchlings to the sea from the nesting beaches (Anon, 1989). In 1993/94 a joint DEC-Fisheries Division project surveyed the nesting beaches and recorded 109 nesting tracks on Nuutele and Nuulua Islands, considered to represent perhaps 25-30 individual females (Schuster et al., in prep). These were similar to results from earlier surveys in 1970/71 (94 tracks) suggesting a relatively stable population, but one that has declined dramatically this century.

## E. FISH

It has been claimed that Samoa's marine fish fauna was one of the richest in the world (Jordan and Seal 1906). The most comprehensive survey of the Samoan archipelago as a whole recorded 991 species of which 890 inhabit shallow water or reefs, 56 are found in deeper water and 45 are pelagic (Wass 1984).





A recent survey of the reef slope alone recorded 266 species for the Samoan archipelago (Green, 1996). While a large number of species may be present it is likely that ongoing degradation of coral reefs and overfishing have lead to significant declines in number of almost all the harvested fish species.

## F. INVERTEBRATES

The mangrove, lagoon and coral reef environments support an enormous diversity of marine invertebrates many of which are harvested as important food sources. Some such as the Palolo Reef Worm (*Eunice viridis*) are also of great cultural significance to Samoans. Pearsall (1992) lists 14 threatened species including several corals and clams, and the coconut crab (*Birgus latro*).

There are several aquaculture projects either ongoing or planned. Some involve introduction of new species such as the Eucheuma seaweed (*Kappaphycus alvarezii*), the Trochus shell (*Trochus niloticus*) and the Giant Clam (*Tridacna gigas*), and others the supplementation of native species such as the clam *Hippopus hippopus* and *Tridacna derasa* which are severely depleted or extinct in Samoa from over-exploitation.

**TABLE 5.1 : SAMOAN BIODIVERSITY SPECIES LIST**

SPECIES	ENDEMICS	NATIVE	INTRODUCED	THREATENED	TOTAL
Flowering Plants	156	App.500	App.500	App..136	App.1000
Ferns					220
Land Birds	8	33	3	14	35
Sea Birds	-	-	-	N/A	21
Reptiles	1	4	11	4	14
Ants	12		N/A	N/A	59
Snails		16	4		20
Butterflies	2	19		1	21
Aquatic Fauna		25	4		29
Corals					N/A
Marine Vertebrates				4	8
Marine Invertabrates				14	95
Fisheries	N/A	890	2		991

### 5.1.4 DECLINE OF BIODIVERSITY

Significant declines are evident in all fauna and flora groups studied in any detail. The start of such declines is hard to determine, as the written record is not extensive. Some change is likely to have happened before the arrival of the early European explorers in the 18<sup>th</sup> Century, for in other islands where this has been looked at the sub-fossil record has shown birds to have become extinct during the initial period of human settlement. By 1903, when Kramer was writing his extensive work on the Samoan Islands, it was evident that significant reductions were occurring, such as those of the pigeons that were hunted with firearms for food. The rates of decline have increased significantly since then as a very rapidly growing population cleared forest for cropping and continued to over-exploit some species.

The birds provide good indication of the declines that would have affected many animals and plants.



They are distinctive, easily seen and thus written about by many observers. They also occupy a wide range of niches towards the top of the food chain so that changes in their numbers are a measure of the health of many ecosystems. Whereas early explorers reported the Pacific Pigeon or lupe to be so numerous their flocks darkened the sun, Kramer recorded this not be the case in his time (1902-3) due to shooting. Numbers and the range of the lupe will have declined significantly since then as forests have been cleared (see later information). More recent trends are shown by counts conducted by biologists at intervals since 1982 (though sample sizes are small). At O Le Pupu Pue National Park, for example, the average number recorded per 5-minute count declined from 1.31 in 1982 to 0.28 in 1991 (after Cyclone Ofa) and to ? in 1992 (after Cyclone Val). A subsequent recovery from these very low levels is suggested by counts averaging 2.0 in 1999.

As a further example, the Maomao was reported as one of the principal songbirds found far and wide by Kramer (1902-03). It was only recorded once on Upolu and a few times on Savaii during the lowland survey (Park et al., 1993), and only at 6 sites in the upland survey, in very low numbers (Schuster et al., 1999). It may now be in danger of extinction.

Endangered species have been identified among birds, plants, invertebrates and marine reptiles and invertebrates. Whole ecosystems have also become very rare, such as the 'mixed swamp forest'. Continuation of present rates of decline will ensure losses among Samoa's unique species and reversing this trend is a key aim of this strategy. The following section examines factors behind the decline.

## **5.1.5 FACTORS CAUSING DECLINE OF BIODIVERSITY**

The natural environment in Samoa has been greatly affected in recent years through increased forest clearance for agriculture, logging operations and particularly in coastal and marine areas, by pollution and over-exploitation of the sea's natural resources. In addition, two very severe cyclones, Cyclone Ofa (March 1990) and Cyclone Val (December 1991), the most destructive storms in living memory, have caused extensive damage to the natural areas remaining on the islands.

### **5.1.5.1 Forest Clearance:**

Deforestation has been identified as one of the key problems to be addressed by the NEMS. Approximately one third (23,885ha) of the country's forests were cleared between 1977 and 1990 and the forest clearance rate in the last five years of 3% per annum is one of the highest in the world. At the current rate of clearance (50ha/year on Upolu, where there are no commercial logging licenses, and 1000ha/year on Savaii) all merchantable forests will be gone at the beginning of this century. The term 'merchantable' can roughly be equated with 'lowland', i.e. lowland forests have been almost eliminated and the conservation of the remaining fragments is an urgent priority.

### **5.2.7.10 Population growth:**

The increase of population and especially its concentration in Apia and its lowland coastal areas have consequently exemplify pressures on the islands ecological resources. Reclamation of the coasts, widening of roading systems, development of production, service and consumer infrastructures in and around Apia have increased adverse environmental impacts of material and social services such as waste generation, air and land pollution, erosion and degradation of coastal areas. This trend is rapidly spreading to areas close to Apia – such as along the north coast from Apia to the country's international airport.



### 5.1.5.3 Over-exploitation of natural resources:

Over-exploitation of natural resources has occurred in terrestrial and marine systems. Hunting of pigeons, doves and fruit bats has apparently reached un-sustainable levels, particularly in the immediate aftermath of the cyclones when they were easier to hunt. The numbers and average size of fish caught in the lagoons have declined dramatically and local populations of turtles have been reduced to apparent critically low numbers. Such hunting pressures are made worse by the demands of the increasing population. Furthermore, there has been a rapid expansion in the offshore areas with longline fishery and bottom fishing.

### 5.1.5.4 Non-sustainable developments:

An increase in major developments will also pose a threat to the remaining areas of biological resources if such developments are non-sustainable or not adequately screened of environmental degradations. The Afulilo Hydro Scheme indicates the difficulties of balancing conservation and development needs on small islands. Its construction resulted in the loss of a unique area of swamp forest that was recognised as one of the country's priority site in terms of global conservation (Pearsall & Whistler, 1991). Furthermore, the ongoing reclamation of mangrove and lagoon areas at the edge of Apia and other areas, is another obvious illustration of the same problem.

### 5.1.5.5 Natural disasters:

Samoa has a history of natural disasters, particularly volcanic eruptions (the most recent being in 1911), earthquakes and tropical cyclones. The latter have had the most widespread impact on biodiversity and are relatively frequent though Samoa is not on the main cyclone path. Between 1972 and 1988 for example four named cyclones affected the group (Pauga & Lefale, 1988). However the two that struck in 1990 and 1991 were the most destructive this century. Cyclone Ofa in February 1990 affected the group for three days with winds gusting to 130 miles/hour. Cyclone Val in December 1991 had winds averaging 104 miles/hour and gusts up to 150 miles/hour over four consecutive days. The impact of Cyclone Val on forests, birds and flying foxes was particularly severe (Lovegrove et al., 1992).

### 5.1.5.6 Spread of introduced animal and plant pests:

#### A. MAMMALS:

The introduced mammals, rats (3 species), pigs, dogs and cats will all have contributed to declines in native fauna, either as predators or competitors though little detailed information is available. Elsewhere in the Pacific, particularly in New Zealand, their impact has been dramatic. Rats as predators of seed and pigs, through their rooting, will also have affected Samoa's flora.

#### B. PLANTS:

A significant number of plant weeds have been identified in Samoa, posing a particular threat to recovery of native forests from cyclones or other disturbance. These 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 (*Paspalum conjugatum*), pasture grass (*Ishaemum timoriense*), tamaligi (*Albizia sp.*), siapatua (*Elaeocarpus sp.*), pulu vao (*Funtumia elastica*), and pulu mamoe (*Castilla elastica*).



#### C. INVERTEBRATES:

The giant African land snail is the most recent conspicuous invertebrate pest to threaten parts of both agricultural and natural ecosystems in Samoa. A number of other pests that are a problem to agriculture are known, e.g Rhinoceros beetle.

#### AMPHIBIANS:

Live samples of the frog in American Samoa have been found in few places in Apia. There are no evidence of its spread and the causes of its introduction is uncertain. Investigations by MAFFM is progressing on this serious matter.

#### MARINE:

Coral bleaching and significant spread of crown of thorns (*Acanthaster planci*) underscores the severity of coral reef degradation through land based pollution of waste and flood material, destructive and excessive fishing practices, and global warming.

Moreover, the impact of cyclones earlier this decade have added to the destruction of reef systems and enclosing lagoons, as evidence in dead coral and sand mounds on reef flats around the Upolu and Savaii, and erosion of coastal areas.

#### F. POLLUTION & WASTE DISPOSAL:

The draft National Waste Management Policy identifies several sources of pollution. Urban waste, including sewage, and industrial wastes may pollute waterways, streams and ultimately the marine environment, particularly the lagoons. Pesticides used in agriculture can pose a threat to native biodiversity if incorrectly used. Mangrove forests have often been used as rubbish dumps in the past, and though the Apia municipal dump has been moved from the Vaitoloa mangroves it will take years for the area to be re-habilitated. Atmospheric pollution from industry and fires used to burn rubbish, including grass, and for cooking, may pose a further threat.

#### G. CLIMATE CHANGE & SEA LEVEL RISE:

The degrading impact of severe climatic changes on Samoa's biodiversity has felt more strongly in the last decade of the ending century. The destruction of ecosystems and depletion of species populations will take years to regenerate.

Evidential coral bleaching may increase with increasing frequency of El Nino Southern Oscillation (ENSO) events as in 1997/8 where due to the currently lower sea level, coral reefs are more exposed for longer periods.

Though definite evidence of sea level rising is not ascertained in the islands, Samoa's coasts in lowlying flat areas are experiencing severe erosion from strong wave action which are often compounded by water currents made acute by land reclamation and sand mining.

#### 5 OZONE DEPLETION:

No study has been done on the effect of ozone depletion on Samoa's biodiversity, apart from the waste



impact of discarded equipments and materials carrying ozone depleting substances such as freezers, air conditions, and a variety of foam products that are forming a significant portion of non-biodegradable wastes in the country.

### **5.1.6 BENEFITS OF BIODIVERSITY**

The benefits derived from biodiversity can be divided into four:

- 5 Direct Benefits – derived from the observed use of biodiversity
- 6 Indirect Benefits – derived from presence of biodiversity but not seen to be used
- 7 Optional Benefits – the value of possible future direct and indirect uses, which are no longer an option if biodiversity is lost
- 8 Existence Benefits – a value independent of current or future use, like the value of the variety of life itself

#### **5.1.6.1 Direct benefits from the use of Biodiversity:**

##### **A. TERRESTRIAL**

###### **i) Flora:**

The flora of Samoa is very significant to the life and well being of the people.

About 30% of the Samoa's forest trees are used commercially for timber, mainly as building materials for houses and for general construction work. Certain hardwoods are mostly used for handicrafts such as woodcarving, tool making, Samoan war weapons etc. Another use that is most obvious in the community is for fuelwood where almost all hard wood species are suitable for this purpose

The importance of grass and weeds as reported is for pasture for animal feed like cattle, horses etc. and for composting in a sense to enhance soil fertility.

Over 100 native plants are currently used for traditional medicines for a variety of purposes ranging from baby sickness to pregnancy to toala, and sprains. A considerable number are used regularly for decorations such lagaali, laumaile, and mosooi. Several species of ferns are identified for medicinal use and the stems of others are commonly used for garden posts and flowerpots. Several plants and animal parts are used for hunting and fishing tools.

Agriculture dominates the Samoan cash and subsistence economies, accounting for nearly all the crops that are used for domestic consumption while some like coconut, cocoa, bananas and taro also provide the main exports. The majority of main agricultural produce are sold locally in our local produce market, eg. banana, coconut, head cabbage, etc.

For other crops like fruit crops with numerous varieties are mostly used in research type of work such as improvement programs, germplasm and fruit tree project as well as for medicine. And they are commonly used for consumption purposes in terms of ripen fruits. Ornamental crops like anthurium, orchids and others are used for commercial cutflower nurseries and flower arrangement which develop by some of the local flower gardeners.

For the traditional practices of medicinal plants, numerous studies on this area have been carried out mostly by Whistler and Kramer (1995). Due to the complexity of ethno-medicine in Samoa, only some of the medicinal plant species and the common treatments are presented.



The practice which is mostly used by many local healer (Taulasea Samoa) is the water infusions made of fresh leaves or bark, often in combination involving many different species are very common in Samoa ethno-medicine. Fresh leaves are often used externally in combination with massage, even for treatment of internal ailments.

For example: The species of *Morinda citrifolia* (Nonu)

Uses:   Flowers -        Juice is prepared to cure inflammations in eyes.  
          Fruits  -        The juice constitutes a remedy for mouth and throat infections.  
                                  Juice from fermented fruit is sometimes taken as treatment for rheumatism.  
          Leaves -        Fresh leaves are applied externally in combination with massage to treat head ache, fever, inflammations and skin infections. A water infusion made of the leaves of Nonu also may be taken to treat urinary problems as reported by Arvidsson.

## ii) Fauna:

The birds are important to the ecosystem of the island as seed dispersers and pollinators. The grey frigatebird (Atafa) is believed by the Samoan people that when it appears in horizon it is indicating storm. The feathers of the bird such as the white tailed bird (tavae sina) are used to tightly tied with a hook as a bait for fishing. The crimson crowned (manutagi) fruit dove is one of the birds that its feathers are used for decorating fine mats.

There is no up-to-date information on the uses of other mammals in Samoa, except for the meat of flying foxes, which have been recorded consume by some of the local people in the past. The very important uses of bats is for regenerating of the forest through seed dispersal and flower pollination.

Snakes were used for biological control in the past by placing them in cocoa plantation to control mice.

The production of the honey for export and local consumption is extracted from the Bee Farming of the Italian Honey Bee. Insects found in Samoa have contributed widely to the floral pollination. Other uses include their commercial values obtained from producing wax for making candles. They are also use for medicine purposes and for nutritional value as reported by the Women in Business. The Rhinoceros beetle in the other hand is recommended for its traditional value in which the wings are used for handicrafts.

## B. FRESHWATER

Freshwater species such as prawns, eels and Tilapia are mainly used for food. There are two known freshwater prawn species found in all freshwater systems throughout Samoa, and these are the fa'ivae (*Macrobrachium lar*) and ulavai (*Palaemon sp.*) (Bell & Ropeti, 1995). Freshwater eels tuna (*Anguilla marmorata*) is also consumed. Two introduced tilapia species (*Oreochromis mossambicus*, *O. niloticus*) has been introduced into Samoa for consumption.

## C. MARINE

### i) Commercial / Subsistence:



There is no up to date information stating the current uses of marine species aside from general consumption. However, most of the oceanic finfish were been reported from Fisheries Division have been exported such as albacore, skipjack and yellowfin tuna. The fresh finfish that are not exported are sold locally.

About 9 coral species are used for decorations of marine aquarium which have been recorded, four coral species have important values for medicinal purposes and two other species are reported were traditionally used to produce lime for painting. In the olden days, corals were generally used for burial activities.

The traditional knowledge that is used for fishing is one of the very important aspects to promote the conservation and sustainable use of biodiversity. And most of these knowledge, practices, methods and techniques were adopted from our ancestors in which some practices are still using to date. eg. Rod fishing (Seuseu), mata. Traditional practices like the using of the ava niu kini to poison fish that is reported being killed much of the reef fish should be banned completely because it is unsustainable. Another type of the same practice which need to be stopped is the “tuiga amu or tuiamu”. This is because it can damage much of the corals as it serves as habitat for the reef and the lagoon fishes. However, non finfish such as shellfish and loli are used for food security and are sold for money earning.

**ii) Traditional:**

The Samoan way of fishing (eg. Rod fishing, Basket fishing etc..) and its fishing methods is very appreciated together with their traditional practices and is quite significant in respect of the availability of the resources for the need of the present and future generation.

**5.1.6.2 Indirect benefits from the use of biodiversity:**

For the ecological value, trees provide soil enrichment and source of protein for animal feed and many other numerous uses. eg. erosion control, animal/plants habitats, wind protection, flood/runoff control, etc. Most of the shrubs have been recorded are very significant as nitrogen-fixing plants. For example: *Erythrina variegata* (Gatae Samoa).

As some plants does not need full sunlight for better growth, some of the trees are important for this purpose in providing shades not only for remnants but also for protection of human beings and animals.

Other very important indirect benefits of biodiversity to Samoa include the use of trees as an important aspect of carbon sink to absorb the release of greenhouse gases to the atmosphere and regulating the climate. Forests provide a very important function in the protection of watershed areas of which majority of the countries water supply is derived from. The presence of healthy coral reefs and mangrove forests contribute significantly to the coastal protection.

Commercially, the biodiversity has contribute to the significant increase in the number of tourist arrival to Samoa with small scale ecotourism programmes, developed as well as natural sites and endemic species

The maintenance of Samoa’s culture is very much linked to the preservation of the biodiversity. Apart from the direct benefits to the Samoans from the biodiversity, a vast amount of Samoan muagagana





are derived from direct interaction between people and the environment such as fishing and lupe hunting.

#### **5.1.6.3 Option values of biodiversity:**

A full understanding of the option values of biodiversity can only be fully accounted when current economic valuations of biodiversity is completed.

#### **5.1.6.4 Existence values of biodiversity:**

The value of Samoa's biodiversity to the totality of the planets biodiversity - both in terms of the preservation and continuing evolution of life on earth and as well as its viability as the main source of natural ingredients for human development - is adequately reflected in the discussions above on the values of various elements of Samoa's biodiversity to ecosystem maintenance, food and medical research and the production of a vast array of materials today for human needs.

#### **5.1.7 ECONOMIC VALUE OF BIODIVERSITY:**

The Gross Domestic Product provides an indicator of the growth of the economy of a nation. The GDP for Samoa in 1999 was estimated at SAT \$718.4 million at current market prices (Treasury Department, 1999).

Agriculture, fishing and handicraft can be classified s marine and terrestrial based sectors of the economy – each contributed 8.2 %, 7.8 %, and 0.3 % of the GDP respectively.

The growth of tourism related industries such as hotels and restraunts and transport are partially dependent upon the marine and forest resources that provide eco-touristic attractions. Holiday tourists are attracted to Samoa for these natural attractions and cultural attributes. Tourism earnings have contributed 18.8 % of GDP.

The goods and services provided by the terrestrial and marine resources though essential, have not been directly accounted for in the GDP for several reasons. These goods and services are not transacted through formal markets and in some cases markets do not exist to permit payments for their utilisation. In other cases, the values of these goods and services have been misallocated as returns to labour and entrepreneurship making wages and profits excessive. Hence, these natural resources tend to be treated as a 'free good'.

The economic valuation exercise conducted recently is aimed at reallocating the excessive wages and profits attributed to labour and entrepreneurship during the extraction and utilisation of the goods and services provided by the terrestrial and and marine resources back as resource rents. This occurs particular so in th eproduction of timber, non-tmber forest products and fishing. When no market exists for the utilisation of these resources such as for recreational services and the indirect benefits of the ecological funitons of the rerrestrial and marine resources, the values were elicited directly from society using the contingent valuation method. The estimate total economic value fo the goods and environmental services of the selected terrestrial and marine resources is provided in the Table 5.2.

The economic value was assessed at SAT \$27.8 million per annum that is about 3.2 % of the GDP. This contribution is significant given that these resources are either the primary input in the production of fishery, timber and non-timber materials and the critical attractions to the tourism industry without which the multiplier from the touristic earnings could not have been generated. The life support



function of these resources need not have to be further justified.

**TABLE 5.2: ECONOMIC VALUES OF SAMOA'S FOREST & 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
<b>Total Forestry &amp; Marine Resources:</b>				<b>\$24,763,359.00</b>

\*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

## 5.1.8 PAST AND CURRENT MANAGEMENT OF BIODIVERSITY IN SAMOA

### 5.1.8.1 Ecological Surveys:

The earliest biological survey using modern ecological methods was carried out in 1974 by Holloway and Floyd (1975) who recommended a Conservation Reserves system for Samoa consisting of six National Parks, twenty four Nature Reserves, eighteen Historic Sites, five Wildlife Sanctuaries and six Recreation Areas. Following this survey, Whistler (1978) described the vegetation of the montane region of Savaii. Dahl (1980) used these surveys together with an earlier one of American Samoa (Banks, 1982) to describe the range of ecosystems in the Samoan Archipelago as a whole. He recognised 70 Ecosystem Types in the South Pacific within a range of habitats from the deep ocean to the highest mountain top. Thirty-six of these Types occurred within the Biogeographic Province that includes Samoa (ten found only on the atolls of American Samoa).

### 5.1.8.2 Terrestrial Ecosystem Mapping:

Using this basic classification of Dahl as a guide, a joint project was begun in 1987 by the Government of Samoa and the South Pacific Regional Environment Programme (SPREP) with the following aims:

- a. To map the native, terrestrial ecosystems of Samoa;
- b. To decide which of these ecosystems were important for conservation; and
- c. To develop a national plan for conservation of the best sites for the most important ecosystems

The report (Pearsall and Whistler 1991) identified 14 ecosystems as the highest priority for conserva-



tion based on rarity and threats in Samoa. Further emphasising the conservation significance of Samoa they considered that 12 of these 14 ecosystems were of global importance because of world rarity, endangered status or the concentration of species found only in Samoa.

The 14 priority ecosystems:

- a. Mixed Upland Species Swamp Forest
- b. Xylocarpus mangrove
- c. Pandanus turritus Swamp Forest
- d. Freshwater lake
- e. Mixed lowland species swamp forest
- f. Herbaceous Marsh
- g. Rhizophora mangrove
- h. Metrosideros Montane Rain forest
- i. Grassland (native)
- j. Coastal Rainforest
- k. Ridge Rainforest
- l. Bruguiera mangrove
- m. Littoral Forest
- n. Cloud Forest

The 12 ecosystems of global significance:

- a. Coastal rainforest
- b. Metrosideros Montane Rainforest
- c. Cyathea Disclimax Montane Rainforest
- d. Montane Rainforest
- e. Cyathea Disclimax Lowland Rainforest
- f. Lowland Rainforest
- g. Cloud Forest
- h. Mixed Upland Species Swamp Forest
- i. Ridge Rain Forest
- j. Pandanus turritus swamp forest
- k. Mixed Lowland Species Swamp Forest
- l. Herbaceous Marsh

Within these ecosystems they listed 26 sites in order of priority for conservation.

### **5.1.8.3 The National Lowland Ecological Survey:**

Following Cyclone Ofa, a National Ecological Survey (NES) was carried out in the coastal lowlands of Samoa (Park et al 1992). The recommendations of this detailed ground survey resulted in some modifications and additions of extra lowland sites to the list of Pearsall and Whistler (1991). The NES selected fourteen lowland sites which were regarded as the minimum needed to establish a series of representative ecosystems of the lowlands of Samoa. It also identified thirteen Grade III sites.

The following were the major findings of the survey:

1. Grade One Sites : include Uafato-Tiavea Coastal Forest; Saanapu-Sataoa Coastal Wetland (Mangrove Forest); Aleipata Islands; Aopo-Letui-Sasina Coastal Forest; Samalaeulu-Mauga Lava Flow Succession and Forest islands; the Maliolio River Forest and the Vaoto Lowland Forest.



2. Grade Two Sites: include Apolima Fou Coastal Wetland, Saleapaga-Lalomanu Coastal Forest, Vaiee-Tafitoala Peninsula, Vaipu Swamp Forest, Taga-Lata-Salailua Lowland Forest, Siuvao Point, and Mulinuu-Tufutafoe.

3. Conservation of Rare Plants. the survey identified the following plant species for conservation within the ecosystems in which they are found:

3.1 Littoral Forest

*Boerhavia albiflora* Fosb., *Cenchrus calyculatus*, *Gossypium hirsutum*, *Ixora elegans*, *Pongamia pinnata*, *Sophora tomentosa*, and *Suriana maritima*.

3.2 Coastal Marsh

*Centipeda minima* and *Linnophila fragrans*.

3.3 Mangrove Vegetation

*Xylocarpus moluccensis* and *Trichomanes* spp..

3.4 Coastal Forest

*Manilkara dissecta* and *Solanum viride*.

3.5 Lowland Forest

*Blumea mileni*, *Casearia* spp., *Celtis vitiensis*, *Chionanthus vitiensis*, *Cordia aspera*, *Corybas betchei*, *Crataeva religiosa*, *Cryptocarya turbinata*, *Diospyros christophersenii*, *Dracontomelon vitiensis*, *Gyrocarpus americanus*, *Hablolobus floribundus*, *Manilkara samoensis*, *Nothiopsis hoshinoi*, *Strychnos vitiensis*, *Trichosanthes reinekeana*, and *Zanthoxylum pinnatum*.

• Vertebrate Wildlife:

Samoa's vertebrate wildlife is dominated by birds, lizards and a small number of bats.

• Birds: The following sites were recommended for conservation of birds in Samoa: O Le Pupu Pue National Park, Lake Lanutoo, Uafato-Tiavea, Lalomanu-Saleapaga, Aleipata Islands, Vaoto Lowland Forest, Taga-Lata-Salailua, Siuvao Point, Falealupo, Aopo-Sasina High Altitude, Maliolio River. The following species were identified for conservation: tooth-billed pigeon, mao, Samoan triller, Samoan silvereve, Pacific pigeon, white throated pigeon, and fruit doves.

• Reptiles: Insufficient information on the status of reptiles made it impossible to recommend conservation actions for the reptiles.

• Mammals (bats): all the three species (*Pteropus tonganus*, *P. samoensis* and the *Emballonura semicaudata*) are recommended for further protection.

Cyclone Val in December 1991 caused additional damage to these key sites and a further survey was commissioned in March/April 1992 to assess this damage. Lovegrove et al (1992) were able to visit eleven of the fourteen key sites identified during the NES, repeating standard bird surveys to assess the biological effects of Cyclone Val on each. These surveys showed that many forest birds had declined in number, the pigeons and doves in particular being hardest hit. Though the remaining vegetation at most sites was already beginning to recover, the pigeon and fruit bat populations that rely on fruit from the forest will take years to return to previous levels.

This second survey emphasised the urgent need for the implementation of a comprehensive conservation management programme centred around the key lowland sites identified by the NES.



#### 5.1.8.4 Upland Ecological Survey:

In 1994 a pilot upland survey was carried out by a joint team from the DEC and Landcare Research, New Zealand (Clarkson et al., 1995). This was followed by a full survey of upland forest sites carried out by the DEC in 1996 (Schuster et al., 1999). The main objective of this project was to conduct 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 conserve the full range of habitats and ensure the long term survival of species and genetic biodiversity. This project was funded under the Government of New Zealand's Assistance and Support towards environmental programmes.

##### Summary of Survey Results:

1. Vegetation: The forest is recovering at higher elevations in Savaii because of limited human interference. At lower elevations, the forest is recovering slowly at Salega, Gagaifomauga and Asau. The damage to the montane forests is much more extensive in Upolu than Savaii. This is largely due to human induced activities. The vegetation in most areas is dominated by introduced species.
2. Birds: Many of the species have declined dramatically and some are threatened to extinction. The friendly ground dove (tuaimoe) is considered to be on the verge of being extinct from the main islands except for a small population found on Nuutele and Nuulua. Other species such as the pigeons, doves and bats are recommended for continued conservation and protection.
3. Plants: Plants that may be considered endangered are recommended for conservation.
4. Invasive Species: The following invasive species need priority action for their eradication and or control: Koster's curse (*Clidemia hirta*), Night-blooming cestrum (*Cestrum nocturnum*), mint weed spp. (*Solanum spp.*), Giant African Snail (*Achatina fulica*).  
These species are also recommended for closely monitoring programmes to control their spread:  
Plants: tamaligi (*Albizia spp.*), Siapatua (*Elaeocarpus spp.*), pulu vao (African rubber tree), pulu mamoe (*Castilla elastica*).

#### 5.1.8.5 Survey of Marine Habitats:

When a village agrees to set up a fish reserve; the Fisheries Division carries out a survey to assess the biodiversity of the reserve area. The survey assesses fish and invertebrate diversity and abundance as well as substrate composition. The fish reserves include various habitats such as reef flats, seagrass beds and lagoons. This assessment is to get baseline information on the area and for comparison of changes in biodiversity as re-surveys are carried out on at least a 12-monthly basis. The methods used include manta tow, line transects and underwater visual census for observing fish and invertebrates.

#### 5.1.8.6 Protected Area Systems:

There are about eight different types of protected area systems currently being practiced in Samoa. These are:

- i. National Parks
- ii. Nature Reserves
- iii. Watershed Management
- iv. Conservation Areas
- v. Village Agreements



- vi. Fisheries Reserves
- vii. Sites of tourism significance
- viii. Traditional protection systems

## 5 NATIONAL PARKS:

A national park is defined as being a large area where:

- a. there is one or more ecosystems that have not been altered or affected by human induced activities and where animal or plant species, geomorphological sites or landscapes have significant scientific, educational or recreational value;
- b. there is a statutory authority for their protection and management;
- c. provision is made for the encouragement of visitors to enter with certain conditions, for recreational, educational, cultural and inspirational purposes.

To date the only National Park established since the National Parks and Reserves Act 1974 was enacted is O Le Pupu Pue. O le Pupu-Pu'e was declared as a National Park in 1978 making it the first National Park to be established not only in Samoa but also in the whole South Pacific region. It protects 30 square kilometers of forest from the coast up to the peaks of Mt. Pue (840m) and Mt. Fito (1100m) on the central ridge on Government owned land.

## B. NATURE RESERVES:

The National Parks and Reserves Act 1974, Section 6 (1) defines nature reserves as:

any public land or any area of the territorial sea, that is not set aside for any other public purpose, to be a nature reserve for the protection, conservation, and management of flora, fauna, or aquatic life, or the habitat of fauna or aquatic life.

The assessment of possible sites or areas for nature reserve by Holloway and Floyd in 1975 recommended a total of 24 possible sites.

Following this recommendation, two sites were formally established. The **Palolo Deep Marine Reserve** was formally established in 1979 protecting the diversity of marine life within the deep and inside the designated area being declared as part of the marine reserve at Matautu-tai.

In 1978, the **Tusitala Historic and Nature Reserve (150ha)** comprising Mt Vaea Scenic Reserve, Vailima Botanical Garden and Stephenson's Memorial Reserve was established under the system of nature reserves. Mount Vaea Reserve has historical significance being the place where the famous writer Robert Louis Stevenson is buried.

## C. WATERSHED MANAGEMENT:

Management of complete catchments is an approach which has been applied with some success by the Forestry Watershed Division within the Vaisigano Catchment above the town of Apia. This approach looks at improving total land management in close consultation with customary land owners. In addition to potentially implementing conservation management on the natural areas remaining in the catchment, it addresses improvements to farming and road building practices and rehabilitation of degraded areas to achieve better overall management of the catchment's water resources. Work has been extended to the Fuluasou, Falefa and Faleseela Catchments on Upolu and Vailoa Faliata on Savaii. This approach is based on the Watershed Protection and Management



Regulations 1992.

**D. CONSERVATION AREAS:**

Conservation areas, unlike national parks and nature reserves, emphasize the importance of conservation but at the same time addressing the need for sustainable development activities within the conservation area. This approach tries to create a balance between nature and the need to provide for the daily livelihoods of people. The concept of conservation areas is currently being promoted around the Pacific regions through the South Pacific Biodiversity Conservation Programme (SPBCP) of SPREP. In Samoa, two areas were established and are now established as conservation Areas and they are the Uafato Conservation Area and the Saanapu-Sataoa Conservation Area. For the purpose of this report, the Saanapu-Sataoa Conservation Area is used to illustrate and explain the main focus of a conservation area and issues relating to it.

**E. MARINE BIODIVERSITY PROTECTION & MANAGEMENT:**

This project administered by the IUCN adopts the same type of participatory approach in seeking to establish Marine Protected Areas in the Aleipata and Safata (including Saanapu-Sataoa) Districts. Its objective is to empower the local communities of these districts to effectively protect and manage coastal marine biodiversity and help them achieve sustainable use of marine resources.

**F. VILLAGE AGREEMENTS:**

This approach is based on agreements or covenants signed between local villages and outside, overseas-based conservation organisations to conserve forest areas for varying periods (20-50 years) in exchange for significant development aid. Such arrangements depend on mutual trust and understanding between the two parties involved. Three areas on Savaii are covered by such covenants, the Falealupo Rainforest Preserve, Tafua Rainforest Preserve (including land of Tafua, Faala and Salelologa villages) and Aopo Cloud Forest Reserve.

**G. FISHERIES RESERVES:**

About 56 village-based Fisheries Reserves have been established in Samoa so far within a Fisheries Division programme supported by AUSAID. This programme focuses on promoting village or community involvement in the management of these fisheries reserves in an effort to conserve the fishery resources to enable it to replenish and recover to a more sustainable state. The approach is based on a participatory system where the villagers themselves make the final decision on whether they should set up a fishery reserve and also in the development of management plans.

Some villages have also set up village by-laws under this system of protection to provide the legal mandate for managing their fishery resources effectively. There are also other management measures that have been explored by other villages such as reinforcing village rules and regulations.

**H. SITES OF TOURISM SIGNIFICANCE:**

This approach seeks to protect areas indirectly through tourist-related activities and programmes. More than 20 sites have been registered under this programme with the Visitors Bureau with the main emphasis on promoting tourism utilising the key biodiversity features found there. For example, the Saleaula Lava Fields promote the remnants of the Mt Matavanu eruptions and at the same time indirectly conserving other key features of the sites that have significant conservation value.





## I. TRADITIONAL PROTECTION SYSTEMS:

Many of today's indigenous and local communities have and still do use terrestrial, marine and aquatic biological resources for a variety of economic, cultural and religious purposes. Cultural control mechanisms and a rich library of traditional knowledge have co-evolved with the customary used of biological resources, helping the Samoan communities avoid over-exploitation and adapt to living within the limits imposed by their availability. Some examples of cultural and traditional control mechanisms for conservation and protection in Samoa are as follow (Safaileupolu, Conservation Mechanisms).

### i) **Cultural Control – Traditional Hierarchy System:**

1. Family Hierarchy.
2. Village Hierarchy.

These systems assure the even allocation, distribution and sharing of families and villages natural resources among their people. The system actually set up a limit for everyone, preventing the over-exploitation of the biological components (Safaileupolu, Conservation Mechanisms).

### ii) **Cultural Control – Traditional Practices / Customs:**

1. Land Tenure System.
2. Agriculture Practices.
3. Taboo System.
4. Traditional Special Food Preference.
5. Traditional Games.

These Samoan practices and customs do contribute to the conservation of Samoa's biodiversity by:

- lineal ownership of land, grazing rights, forest resources of or fishing areas;
- use of particular agricultural, forestry, and fishing techniques or technologies which lower the impact of the use or even increase biological diversity;
- rotational use of hunting, agricultural and fishing areas;
- protection of special forest groves for religious/spiritual reasons;
- self-imposed hunting restrictions;
- taboos/limitation on hunting or harvesting certain species;
- considered hunters for a certain species (pigeon); and
- special people for hunting or collecting important species (such as pigeon / shark / sea turtle).

These traditional mechanisms had contributed a lot and are still playing a vital role to biodiversity conservation in Samoa. With the arrival of western influences that eventually changed people's preference and priorities, Samoa is in a critical position to react to the changing world by ascertaining ways of adapting other measures.

### **5.1.8.7 Species Protection Programmes:**

Several initiatives have been conducted to promote the conservation of specific native and indigenous species that are endangered, threatened or becoming very rare. These programmes have been coordinated and implemented by various agencies and usually with assistance from donor agencies. Species protection programmes that have already been undertaken or are currently being implemented in Samoa are summarized as follow:

## 5 SOUTH PACIFIC REGIONAL INITIATIVE ON FOREST GENETIC RESOURCES PROJECT:



The SPRIG project was initiated in 1996 with its overall objective and that is to better conserve and sustainably develop the region's forest genetic resources. This project is currently being coordinated and implemented by the Forestry Division. The rationale for this project arose out of concerns at the increasing rate at which forest genetic resources are destroyed as a direct result of logging and agricultural activities.

**B. TOOTH-BILLED PEGION (MANUMEA) CONSERVATION PROGRAMME:**

The Division of Environment and Conservation together with the RARE Center initiated this awareness campaign in late 1992 targeting the protection of the manumea as a flagship species for the protection of rare and endangered birds and protection of forest habitats.

**C. SEA TURTLE CONSERVATION PROGRAMME:**

This regional program used a similar approach to the manumea but using the sea turtle as a flagship species for the conservation of rare and threatened marine species especially the sea turtle.

**D. PACIFIC-GERMAN SUSTAINABLE INDIGENOUS FOREST PROJECT:**

The Forestry Division in collaboration with the Village Council of Samalaeulu and the South Pacific Community has established a pilot site of this regional project at Samalaeulu Lowland Forest. Its 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 undertake the first trial harvesting of the forest resources at the pilot site, based on the system that was developed through biological and technical surveys and studies that was carried out of the site in 1998 - 1999.

**5.1.8.8 Legislation, Policies & Plans Relevant To Biodiversity Conservation:**

A complete assessment of legislative and policies in relation to the conservation and sustainable use of biodiversity and Samoa's position in relation the relevant articles of the CBD are provided in the report of the Policy and Planning Technical group.

Although legal mechanisms are recognised as mostly in place to address conservation and sustainable use issues, they do not adequately address current relevant and critical biodiversity and conservation issues.

**A. LANDS AND ENVIRONMENT ACT 1989:**

Part 8 of the *Lands and Environment Act 1989* defines the work of the Division of Environment and Conservation through definition of the positions of Principal Environment Officer and Conservation Officers. One of the principal functions under part 8 is to "...Ensure and promote the conservation and protection of the natural resources and environment of Western Samoa...". Among recommendations to be made to the Minister under this act are those for the establishment of national parks and reserves, for carrying out investigations and research relevant to protection and conservation of natural resources and the environment and for the promotion of public awareness of the importance of the environment and its conservation.

The more specific items of legislation relevant to Biodiversity Conservation are the *National Parks and Reserves Act 1974* the *Protection, Conservation of Wild Animals Regulations 1993*, and the *Local*



*Fisheries Regulations 1995.*

**B. DRAFT ENVIRONMENT BILL:**

The new Environment Bill is at its final stages of consultation before submission for Parliament approval. The new Bill has incorporated aspects of meeting CBD obligations that were missing from the Lands and Environment Act 1989. Features of the Environment Bill of particular relevance to biodiversity work include the Environmental Impact Assessment, environment fund, and the environment council to assess activities impacting the environment of Samoa.

**TABLE 5.3: LIST OF SAMOA'S RELEVANT BIODIVERSITY CONSERVATION LEGISLATIONS**

LEGISLATIONS	SCOPE OF ACT	RESPONSIBLE AGENCIES
<i>CURRENT LEGISLATIONS</i>		
Lands and Environment Act 1989	To ensure and promote the conservation and protection of the natural resources and environment of Samoa. The main agency responsible for the conservation and sustainable use of biodiversity.	Division of Environment and Conservation
National Parks Act 1974	To establish and manage protected areas in Samoa.	Division of Environment and Conservation
Fisheries Act 1988	To promote the protections and preservation of the Marine Environment.	Fisheries Division
Fisheries Regulation 1995	To protect the fish harvesting sizes and conservation measures.	Fisheries Division
Plants Act 1984	To regulate the export of plants materials from Samoa.	
Plant and Soil Importation Regulation 1950/1951	To regulate the importation of plant and soil materials into Samoa.	Agricultural Division
Animals Amendment Act 1971	To regulate the domestication, farming and trading in native and introduced animals.	Agricultural Division
Forest Act 1967	To manage and sustainably use the forest resources of Samoa.	Forestry Division
Watershed Management Regulations 1992	To protect and manage the five identified water catchment areas in Samoa.	Forestry Division
Village Fono Act 1989	Recognise the traditional management systems for the control of village resources and village management.	Ministry of Internal Affairs
Protections and Conservation of Wild Animals Regulation 1993	To protect threaten and endangered wild animal biodiversity of Samoa.	Division of Environment and Conservation
<i>PROPOSED LEGISLATIONS</i>		
<i>Environment Bill</i>	<i>Framework Act for the management of Samoa's environment and biological diversity</i>	<i>Division of Environment and Conservation</i>
<i>Environment Bio-Prospecting Regulation</i>	<i>To regulate access to Samoa's genetic resources and the equitable sharing of benefits derived from its uses</i>	<i>Division of Environment and Conservation</i>

**5.1.8.9 National Policies & Plans:**

**A. NATIONAL BIODIVERSITY POLICY:**

The national biodiversity policy committee is currently developing the policy and the national biodiversity strategy for Samoa. The process was established in 1996 but has been on hold due to the lack of funding to complete the process.

**B. FOREST POLICY:**



The National Forest Policy aims at restoring the balanced multi-use functions of forestry, strengthening forestry administration and encouraging customary owners to become more committed to the protection of the remaining indigenous forests and reforestation activity.

To maintain, and establish where necessary, areas of forest adequate to protect the climate, soil and water resources of the country. As far as possible to provide, on a sustained yield basis, the forest produce requirements of the people and the industry of the country and to encourage an export trade, and to ensure the best use of all forest lands for the general benefit of the country.

This involves the issuing of licenses to control logging of conserved areas, and also places that have significant values. Laws on protection against fires. Control on importation of logs and forest produce to avoid introducing pests and diseases that will cause great damage and infestations to our forests.

C. **LAND USE, WASTE MANAGEMENT, POPULATION & WATER MANAGEMENT DRAFT POLICIES:**

The above-mentioned draft policies were completed as part of the NEMS. All the draft policies having been drafted by an inter-agency task team have integrated conservation and sustainable use components into their respective policies. The policies are currently awaiting cabinet endorsement.

**OTHER NEMS RELATED POLICIES:**

The development of integrated policies for the remaining key environmental areas identified in the NEMS document will proceed at the approval of the present draft policies by Cabinet

**5.1.8.10 Financing Biodiversity Work:**

A. **GOVERNMENT ALLOCATION:**

Government funding priorities are set out within the Statements of Economic Strategy (SES) produced every two years. Biodiversity Conservation does not feature specifically in current priorities which are education and health which have expanded to include agriculture and tourism development in the new SES 2000/2001, but its importance is as clear as the latter two largely depend on.

The SES highlights the importance of two planning tools: Sector Strategic Plans which spell out the objectives, policies and strategies to be pursued in achieving sectoral development, and Corporate Plans which identify missions, structures and operational activities for Government Departments in carrying out their work. Feeding into these two types of plan will be a key way of achieving the actions identified in this National Biodiversity Strategy.

The budget allocations to the following four agencies are the most relevant to the implementation of this strategy:

B. **DIVISION OF ENVIRONMENT & CONSERVATION:**

The Government allocation to the lead agency responsible for the conservation of native biodiversity, the Division of Environment and Conservation, to coordinate and implement environmental and conservation programmes was SAT1.48 million in 1999/2000. This was reduced by 19.7% from 1.84 million last year, but represents a 51% increase overall since 1996/97. Biodiversity and National Parks current budget allocation was \$488, 413 (\$531,694 in 1998/99) or about five times greater than 1996/97.



Revenue generated by the Division through the sale of posters and educational material is \$860,000 a 26% increase compared to 1998/99 and 105% increase since 1996/97.

C. **MINISTRY OF AGRICULTURE, FORESTS, FISHERIES & METEOROLOGY:**

The current allocation to MAFFM has increased to \$7.5 million from \$7.3 million last financial year. The MAFFM generates revenue of \$459,060, 30% higher than the previous year and 142% increase compared to 96/97, much of it generated from biodiversity-related areas such as Quarantine, Animal Production and Breeding (Farms), Hydrological services and Fish Market services.

D. **MINISTRY OF INTERNAL AFFAIRS:**

Most of the current allocation of \$1.2 million for Internal Affairs goes on Rural Development for both Upolu and Savaii, as well as Village Competition and funding of Access Roads to plantations. Activities like the former may contribute to biodiversity conservation but the latter threatens some remaining forested areas.

E. **SAMOA VISITORS BUREAU:**

The Government's tourism agency, the Samoa Visitors Bureau has a current allocation of \$2.5 million and collects additional revenue of \$61,000. Most of this allocation is used for Destinalional Marketing & Promotion, with other areas funded including Hospitality Training and Development Planning.

F. **FUNDING OF NGOS:**

Two NGO's with a primary focus on biodiversity conservation are the "**O Le Siosiomaga Society Inc.**" (OLSSI) and **Faasao Savaii**.

OLSSI received the bulk of its project funding from the Swedish Government, dispersed through an NGO in Sweden, though this was phased out at the end of 1999. An annual allocation of \$100,000 - 150,000 was mostly used to foster developments in specific villages (Tafua, Faala, Salelologa and Aopo on Savaii) in return for the protection of their rainforests. Activities included setting up of beach houses and public conveniences along beach areas, establishing a District hospital and school buildings, the replanting of coconut and timber trees which the village could carve or build furniture with to sell, and setting up trails up a crater and into "cloud forest". OLSS also manage a conservation area project at Uafato in Upolu funded by the South Pacific Biodiversity Conservation Programme SPREP.

The Society is based in Apia and has functioned as an environmental lobbyist. It has also developed several small income-generating projects with the goal of making the organisation sustainable, such as manufacturing recycled paper. Funding from the Canada Fund was used to produce a collection of environmental tapes on a vast range of topics, a book of medicine using local herbs and trees, and photography of local scenes, all of which generated revenue. Its most recent project is the setting up of a "Sleep Unit" where people with obstructive apnea can receive treatment.

**Faasao Savaii** is a village-based NGO and its current annual project budget is \$64,500. Of this \$21,000 is allocated for a Tree Planting Campaign Project which involves growing and distributing seedlings, along with educational and awareness programmes on the importance of sustainability management of forests. \$16,500 is allocated for education programmes on home and land management, utilisation of local materials and recycling. \$27,000 is allocated for Eco-Tourism primarily to



raise awareness of this topic.

Three other NGO's contribute directly to biodiversity conservation. **Komiti Tumama** [Women's Development Committee] has developed a project recycling plastic bags for village women to make handicrafts. It has contributed to annual "Clean Up the World" campaigns with each participating village Women's Committees receiving \$100 from that project.

In 1995, the DEC assisted the Komiti Tumama with an amount of \$2,742 to run several workshops on environment issues with their members. In 1994, the South Pacific Commission provided \$5,000 programme planting trees used for handicrafts and food.

**Women in Business** has several projects which seek to empower women and develop new sustainable businesses, both of which should bring biodiversity conservation benefits. A Bee-keeping project involving 36 villages is funded by Canada Fund (\$57,079 tala) and FAO (US\$10,000 in 1997). A Coconut Oil Project initiated in 1997 with funding from Canada Fund of \$169,000 tala involves two villages in Savaii and four in Upolu and exported 4 tonnes of oil within the last 12 months obtaining a revenue of around \$30,000 tala. NZODA awarded a sum of \$50,000 NZ for a feasibility study and analysis of the oil.

They are now pioneering another project aimed at reviving the weaving of the finest Samoan mats.

#### G. DONOR FUNDING:

Assistance from overseas donors contributes either directly to biodiversity conservation through specific programmes or indirectly by requiring development projects to carry out EIA's and be designed to ensure there is minimum impact on the environment.

Estimates for the period 1998/99 show that approximately 2% of aid received by the Government of Samoa went directly towards the environment sector. On the bilateral level New Zealand, Japan, Australia, and China are Samoa's major aid donors and the first three have provided direct funds for conservation.

Assistance provided under the New Zealand programme has seen the recent conclusion of a 3-year environment and conservation support programme which aimed to increase the capacity of Government, NGOs and community based organisations in addressing sustainable management in Samoa. Prior funding has focussed on protected areas, ecological surveys and the provision of 3 to 4-year Environment Planning and Biodiversity Advisers.

One of the four components which make up the current Australian aid programme is natural resource management which receives approximately 14% of the budget. A large proportion of this amount is directed to community based management of fisheries. Small project funds have been directed at Vailima Botanical Garden.

The main emphasis of Japan's assistance which comes in the form of grant aid, technical assistance and equipment provision has been in infrastructural development which should contribute in the long term to socio economic development and environment protection. However they have supported a waste management project with infrastructure and an adviser. China, similar to Japan does not confine its aid programme to any specific sectors but relies on the needs as identified by the Government of Samoa.

Bilateral aid has been received from other countries including Canada - both to Government and NGO's with a focus on education programmes, Sweden - through NGO's and the US through the Biodiversity Support Programme and Germany - environment information library and forestry





development programmes.

Significant biodiversity conservation funding has been obtained through international and regional programmes particularly those rendered through SPREP, UNDP, GEF, World Bank, IUCN, and UNEP. Major programmes in recent years have been the South Pacific Biodiversity Conservation Programme (conservation areas, turtle and bird conservation through SPREP and UNDP), Enabling Activities for Biodiversity and Capacity Building (UNDP-GEF), and the Marine Protected Area Programme (IUCN).

A final group of significant donors are overseas NGO's such as Worldwide Fund for Nature (WWF), RARE Foundation, the Swedish National Foundation for the Conservation of Nature, and others.

In summary, biodiversity conservation has received significant funding in the past 5-10 years. This reflects ongoing and probably increasing donor commitment to this topic since the Rio Summit, together with an increased development of capacity within Samoa to make effective use of these funds.



*Pandanus on Coastal Cliffs: Pupu Pu'e National Park*





## 5.2 STATUS OF SAMOA IN THE CONVENTION ON BIOLOGICAL DIVERSITY

The Convention provides a framework for the implementation of activities that address biodiversity conservation issues. Measures to fulfill and meet the requirements of the different articles of the Convention are directly a national responsibility. Analysis have revealed that most of the articles of the Convention are generally covered under relevant national policies, programmes and legislations. The results of this analysis in terms of relevant policies, legislations and or actions on these measures (Refer also to Table 5.3) to the Convention articles are summarized below with references to issues that are either inadequately or not at all covered under these actions:

### ARTICLES AND ISSUES:

#### i. Article 6: General Measures for Conservation and Sustainable Use

Current relevant national policies that address biodiversity conservation issues include the following: National Environment and Development Management Strategy (NEMS) Policies: Water Policy, Forest Policy, Population Policy, Land use Policy, Waste Management Policy and other relevant policies identified in the NEMS. Legal mechanisms are also in place to address conservation and sustainable use issues. Although these measures are in place, they are not adequate to fully address relevant and critical biodiversity and conservation issues.

#### ii. Article 7: Identification and Monitoring

Actions have been undertaken to address this article in the form of ecological surveys, research programmes and studies on the various components of Samoa's biological diversity. These include surveys such as the Lowland and Upland Ecological Surveys identifying significant ecosystems and species for protection. Other relevant agencies also conduct their own resource studies specifically on areas where they are directly responsible in. For example, the Observatory Division and the Samoa Water Authority deal with the identification and monitoring of water sources, the Forestry Division on forest species, Agriculture Department conducts research on crops, pests and genetic resources.

This Article requires the identifications and monitoring of processes and categories of activities that have or are likely to have significant adverse impacts on biological diversity. It calls for actions or measures that ensure significant components of biological diversity are conserved and sustainably used.

#### ii. Article 8: In situ Conservation

There is an existing protected area system that promotes in-situ conservation such as the O Le Pupu Pue National Park and the Vailima Nature Reserve. These areas strictly prohibit any other types of activities except for those that promote the conservation of biological diversity. Other protected areas that are in place focus on the conservation of biological diversity and at the same time promoting sustainable use of these resources. These include conservation areas that have been established to conserve the forest at Uafato and mangrove conservation at Saanapu/Sataoa.

#### iii. Article 9: Ex-situ Conservation

Efforts have been made towards the promotion of ex-situ conservation such as the Botanical Garden at Vailima, research, demonstrations and programmes conducted by various relevant agencies such the Ministry of Agriculture, Forests, Fisheries and Meteorology and others.

#### iv. Article 10: Sustainable Use of Components of Biological Diversity

Programmes that reflect the focus of this article are carried by agencies such as the Department of Lands, Surveys and Environment, Ministry of Agriculture, Forests, Fisheries and Meteorology, Samoa Water Authority, and others. Attempts have also been made to encourage cooperation between the key Government agencies



and the private sector and Non-Governmental Organisations to ensure that the sustainability of biological diversity.

v. Article 11: Incentive Measures

Samoa has already practised and adopted incentive measures to encourage conservation and sustainable use of biodiversity. These include conservation areas where ecosystems are conserved while at the same time promoting the sustainable use of the resources through alternative income generating activities. In the other cases locally, agreements have been set up for the conservation of forest areas in return for structural activities such as school buildings and so forth. In the case of water conservation, water meters have been installed to control the use of water thus reducing the consumption rate. However, there is a need to explore options under this article to identify measures that are appropriate to our local situation and those that can be realistically achieved and sustained.

vi. Article 12: Research and Training

Although some research have been conducted in the past relevant to this article, it is important that they are continuously monitored and that recommendations are implemented. Lack of trained personnel on biodiversity knowledge and management was identified from all the different sectors that were analysed. This gap creates obstacles and thus impedes the effective implementation of appropriate actions to ensure the conservation and sustainable use of biological diversity.

vii. Article 13: Public Education and Awareness

Although public awareness programmes have already been conducted targeting all aspects of biological diversity in the different sectors, it is important that they are continuously being promoted. This is to ensure that awareness at all levels are kept updated to keep in line with the continuing changes to the status of biological diversity. Programmes need to be structured accordingly depending on the target audience utilising appropriate and effective approaches to ensure the messages are delivered through.

viii. Article 14: Impact Assessment and Minimising Adverse Impacts

EIA is still on an ad hoc basis as there is no existing EIA legislation in place. The need for one is strongly identified in the NEMS and by other relevant policies. Without an EIA procedure in place, biological diversity will continue to become threatened by development activities that are unsustainable.

ix. Article 15: Access to Genetic Resources

There are existing relevant legislation in place, but they are not specific enough to meet the requirements of this article. An Environment (bio-prospecting) Bill is being drafted to address issues pertaining to this particular article of the Convention. Until such a bill becomes a law, issues on access to genetic resources can not be fully addressed.

x. Article 16: Access to Transfer of Technology

This article has not been adequately addressed nationally as it implies the transfer of appropriate technology from developed countries to developing countries such as Samoa. Further information and dialogue is needed before actions to achieve the objective of this article are put into place. Lack of appropriate technology is identified as a constraint to the effective implementation of actions at the national level thus making it one of the important requirements to ensure the fulfilment of our obligations under the Convention.

xi. Article 17: Exchange of Information

Exchange of information at the national level is encouraged although not adequately implemented to a certain degree because of certain internal procedures within some agencies restricting access to information. At the international level, general information is shared more or less on an ad hoc basis. It is crucial to raise the level of awareness on the importance of sharing vital information that could be used to guide decisions on conservation and sustainable uses of biological diversity.



xii. Article 18: Technical and Scientific Cooperation

Technical and scientific cooperation is very much needed in all relevant areas of biological diversity conservation and sustainable use. This is one of the constraints that affect the effective implementation of biological diversity programmes.

xiii. Article 19: Handling of Biotechnology and Distribution of its Benefits

There is not much information and capacity in Samoa on issues relating to biotechnology.

xiv. Article 20: Financial Resources

From the analysis, limited financial resources were considered as one of the constraints that affected the implementation of national policies and programmes. Very often, local funding is complemented by financial assistance from donor agencies.

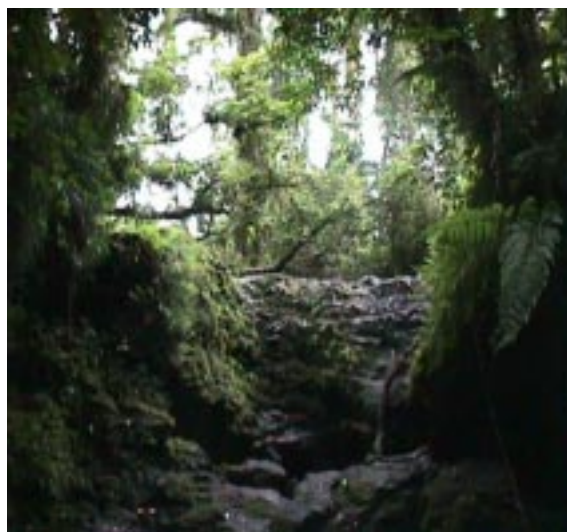
xv. Article 21: Financial Mechanisms

The Global Environment Facility is one of the financial mechanisms created under the Convention to assist developing countries has already granted assistance towards this effect for the promotion of biodiversity conservation and sustainable use in Samoa. These include the Regional Project on International Waters, the Marine Protected Area project and many others that are in the pipeline.

xvi. Article 22: Relationship with other International Conventions

Samoa is party to several Regional and International Conventions and Agreements that are related to biological diversity. There are areas in which the Convention on Biological Diversity may conflict with the provisions of other Conventions such as those under the Convention on the Law of the Sea.

Samoa is not party to the following Conventions: The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR), and the Convention on the Migratory Species of Wild Animals to name a few.



*Mouth of the Pe'ape'a Cave; Pupu Pu'e National Parks*



## **5.3 STEERING COMMITTEE**

The committee is composed of one representative of each of the main Departments or agencies of Departments of Government; Corporations; Statute Bodies and relevant NGOS as listed below.

### **5.3.1 Government Departments:**

Attorney General  
Development Bank of Samoa  
Department of Lands, Surveys & Environment  
Department of Trade, Commerce & Industry  
Education Department  
Finance Resource Management Service  
Health Department  
Inland Revenue Department  
Ministry of Agriculture, Forests, Fisheries & Meteorology  
Ministry of Foreign Affairs  
Ministry of Internal Affairs  
Ministry of Transport  
Ministry of Womens Affairs  
Ministry of Youth, Sports and Cultural Affairs  
National University of Samoa  
Prime Ministers Department  
Public Service Commission  
Public Works Department  
Treasury Department

### **5.3.2 Corporations:**

Samoa Shipping Cooperation  
Samoa Lands Cooperation  
Small Business Enterprises Cooperation

### **5.3.3 Statute Bodies:**

Samoa Visitors Bureau  
Samoa Water Authority

### **5.3.4 NGOs:**

Faasao Savaii  
Women in Business  
Young Mens Christian Association  
Taulasea Samoa  
Samoa Umbrella of Non-governmental Organisations  
Samoa Womens Development Committees Organisation  
National Council of Womens  
O le Siosiomaga Society



## 5.4 TECHNICAL GROUPS

Members of the Steering Committee were divided into five Technical Groups and tasked with the objectives of documenting available pertinent information, identify key issues, and make recommendations on five main areas that have formed baseline information for the formulation of the Strategy and Action Plan. The Technical Groups are cited below:

### Conservation Group:

- |                                  |   |                 |
|----------------------------------|---|-----------------|
| 1. Teleiai Sapa Saifaleupolu     | - | NUS             |
| 2. Tapulolo'u Siuli Tuaillemafua | - | SVB             |
| 3. Tolusina Pouli                | - | MAFFM/FORESTRY  |
| 4. Onopene Ola                   | - | WDC             |
| 5. Autalavou Taua                | - | MAFFM/FISHERIES |
| 6. Faafetai Sagapolutele         | - | DEC/DLSE        |
| 7. Easter C. Galuvao             | - | DEC/DLSE        |
| 8. Lavie Lamese                  | - | DEC/DLSE        |
| 9. Afele Fa'ilagi                | - | DEC/DLSE        |
| 10. Toni Tipama'a                | - | DEC/DLSE        |

### Biodiversity Review Group:

- |                              |   |                       |
|------------------------------|---|-----------------------|
| 1. Teleiai Sapa Saifaleupolu | - | NUS                   |
| 2. So'oalo Albert Peters     | - | MAFFM/CROP PROTECTION |
| 3. Aukuso Leavasa            | - | MAFFM/FORESTRY        |
| 4. Laumata Pelesa            | - | MAFFM/LIVESTOCK       |
| 5. Saini Siaoosi             | - | SWA                   |
| 6. Kolopa Tapumanaia         | - | TSA                   |
| 7. Tapusalaia Faatonu        | - | WDC                   |
| 8. Pisila Nanai              | - | WDC                   |
| 9. Autalavou Taua            | - | MAFFM/FISHERIES       |
| 10. Falaniko Amosa           | - | USP-ALAFUA            |
| 11. Toni Tipama'a            | - | DEC/DLSE              |
| 12. Easter C. Galuvao        | - | DEC/DLSE              |
| 13. Faafetai Sagapolutele    | - | DEC/DLSE              |
| 14. Lavie Lamese             | - | DEC/DLSE              |

### Biodiversity Use Group:

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| 3. Asuao Kirifi                  | - | MAFFM/CROP PROTECTION |
| 4. Laumata Pelesa                | - | MAFFM/LIVESTOCK       |
| 5. Teleiai Sapa Saifaleupolu     | - | NUS                   |
| 6. Tapulolo'u Siuli Tuaillemafua | - | SVB                   |
| 7. Lydon Chu Ling                | - | DTCI                  |
| 8. Vitolia Taua'I                | - | WB                    |
| 9. Sera Asi                      | - | MIA                   |
| 10. Su'emalo Tonu'u              | - | WDC                   |
| 11. Pisila Nanai                 | - | WDC                   |



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|---------------------------|---|----------|
| 12. Salevao Mulipola      | - | WDC      |
| 13. Kolopa Tapumanaia     | - | TSA      |
| 14. Easter C. Galuvao     | - | DEC/DLSE |
| 15. Faafetai Sagapolutele | - | DEC/DLSE |
| 16. Toni Tipama'a         | - | DEC/DLSE |
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| 5. Salma Hazelman        | - | AGM      |
| 6. Asuao Malaki Iakopo   | - | MAFFM    |
| 7. Sara Asi              | - | MIA      |
| 8. Andrea Williams       | - | MFA      |
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## 6. GLOSSARY

**Adaptive Management:** An experimental approach to management, or “structured learning by doing”. It is based on developing dynamic models that attempt to make prediction or hypotheses about the impacts of alternative management policies. Management learning then proceeds by systematic testing of these models, rather than by random trial and error. Adaptive management is most useful when large complex ecological systems are being managed and management decisions cannot wait for final research results.

**Agrobiodiversity:** The variety and variability of animal, plant and microbial organisms on earth that are important to food and agriculture.

**Alien Species:** A plant or animal species which has been brought to Samoa by humans, either by accident or design.

**Biological Diversity (Biodiversity):** The variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (Convention on Biological Diversity). Components include:

*Genetic Diversity:* The variability in the genetic make up among individuals within a single species. In more technical terms, it is the genetic differences among populations of a single species and those among individuals within a population.

*Species Diversity:* The variety of species - whether wild or domesticated - within a particular geographical area. A species is a group of organisms which have evolved distinct inheritable features and occupy a unique geographic area. Species are usually unable to interbreed naturally with other species due to such factors as genetic divergence, different behavior and biological needs, and separate geographic location.

*Ecological (ecosystem) Diversity:* The variety of ecosystem types (for example, forests, deserts, grasslands, streams, lakes, wetlands and oceans) and their biological communities that interact with one another and their non-living environments.

**Bioprospecting:** The search among biological organisms for commercially valuable compounds, substances or genetic material.

**Bioregion:** A bioregion is an area that is defined according to patterns of ecological characteristics in the landscape or seascape. It provides a framework for recognizing and responding to indigenous biodiversity values.

**Biosafety:** The policies and actions taken to manage risks from the intentional introduction of new organisms, including genetically modified organisms, that could adversely affect biodiversity, people or the environment.

**Biosecurity:** The protection of people and natural resources, including biodiversity, from unwanted organisms capable of causing harm.

**Biota:** All the living organisms at a particular locality.

**Biotechnology:** Any technological application that uses biological systems, living organisms or derivatives thereof, to make or modify products or processes for specific use, including genetic engineering (Convention





on Biological Diversity).

**Border of Control:** The policies and actions taken to prevent the accidental or illegal introduction of unwanted organisms across national borders. Border control includes re-import pest control, certification, inspection and surveillance, and emergency responses.

**Conservation:** The prevention and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations.

**Convention on Biological Diversity:** An international agreement on biological diversity that came into force in December 1993. The objectives of the Convention are : the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of the benefits arising out of the utilisation of genetic generations.

**Domesticated or cultivated species:** means species in which the evolutionary process has been influenced by humans to meet their needs.

**Ecosystem:** An interacting system of living and non-living parts such as sunlight, air, water, minerals and nutrients. Ecosystems can be small and short-lived, for example, water-filled tree holes or rotting logs on a forest floor, or large and long-lived such as forests or lakes.

**Ecosystem Management:** A management philosophy intended to sustain the integrity of ecosystems.

**Endemic Species:** An indigenous species which breeds only within a specified region or locality and is unique to that area.

**Ex-situ Conservation:** The conservation of species outside their natural habitat

**Gene:** The functional unit of heredity, the part of the DNA molecule that encodes a single enzyme or structural protein unit.

**Genetic Erosion:** Loss of genetic biodiversity between and within populations of the same species over time; or reduction of the genetic basis of a species due to human intervention or environmental changes.

**Genetic Material:** All or part of the DNA of a genome or all or part of an organism resulting from expression of the genome.

**Genetic Resources:** Genetic material of plants, animals or microorganisms (including modern cultivars and breeds, primitive varieties and breeds, landraces and wild or wild or weedy relatives of crop plants or domesticated animals) that has value as a resource for people or future generations.

**Germplasm:** The genetic material that carries the inherited characteristics of organism.

**Habitat:** The place or type of area in which an organism naturally occurs.

**Indigenous Species:** A plant or animal species which occurs naturally in Samoa. A synonym is “native”

**In-situ Conservation:** The conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and in the case of domesticated or cultivated



species, in the surroundings where they have developed their distinctive properties (CBD)

**Invasive Species:** An animal pest or weed that can adversely affect indigenous species and ecosystems by altering genetic variation within species, or affecting the survival of species, or the quality or sustainability of natural communities. In Samoa invasive animal pests or weeds are almost always species that have been introduced to the country.

**Living modified organism:** means any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology.

**Living organism:** means any biological entity capable of transferring or replicating genetic material, including sterile organisms, viruses and viroids.

**Natural Habitats And Ecosystems:** Habitats and ecosystems with a dominant or significant indigenous natural character. They do not include modified areas, such as farm or forestry land, where the indigenous vegetation has largely been replaced, although these areas may still provide important habitat for indigenous species.

**Protected Area:** A geographic defined area that is protected primarily for nature conservation purposes or to maintain biodiversity values, using any of a range of legal mechanisms that provide long term security of either tenure or land use purpose. It may be either publicly or privately owned.

**Species:** A group of organisms, sharing common features (similar phenotype) and being isolated from other groups in terms of reproduction.

**Sustainable Use:** The use of component of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (CBD)



*Grey Ducks: Saanapu Mangrove Conservation Area*

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