



THE REPUBLIC OF VANUATU'S

FIFTH NATIONAL REPORT

COUNTRY REPORT
TO THE
CONFERENCE OF THE PARTIES ON THE CONVENTION ON
BIOLOGICAL DIVERSITY





Executive Summary

Vanuatu is an array of 83 volcanic islands that were formed during the Miocene Era. Her geographical location means that Vanuatu's biological diversity has developed commonalities with Pacific Island Countries in close proximity such as that of Fiji and Solomon Islands.

Vanuatu is fundamentally an agricultural society, where the majority of the population is involved in farm and fishing activities, either for subsistence, livelihood or cash income. The Overarching Productive Sector Policy 2012-2017 also identifies agriculture, forestry and fisheries as priority areas for economic development.

In 2013, the Vanuatu National Statistics Office estimated the population of Vanuatu to be 264,000 people, with 75% of the population living in the rural areas. A large portion of the population still depends heavily on the Vanuatu productive sector therefore, the Government has a crucial role to play in defining a policy and institutional framework which both enables and encourages good participation and high performance from all sector stakeholders.

The country's development goals and priorities in the Priorities and Action Agenda (PAA) 2006-2015 identify the productive sector as an engine for investment, economic growth and employment. The sector's contribution to the overall economic growth has required a strategic commitment by the Government. This is so the Government can support and facilitate an enabling environment for private sector operators.

The need to protect and conserve the resources that are critical elements of the productive sector saw Vanuatu commit itself internationally to the Convention on Biological Diversity in the 1992. Since its ratification of this Convention, Vanuatu has made significant progress in ensuring it meets all of its obligations. There has also been a drive to substantiate the realities of natural resources within the country with scientific data. This is evident in successfully completed studies and subsequent reports such as The Natural History of Santo (2006), a biodiversity survey of Santo, The Vanuatu Freshwater Fishes and Crustaceans (2010), the Mangrove Ecosystems for Climate Change Adaptation and Livelihoods (MESCAL) Biodiversity Assessments and Technical Reports (2013), , the Lake Letas Limnology Study (2012-2013) and the Plant Inventories and Rapid Fauna Assessment of Conservation Areas on Santo, Malekula, Pentecost, Nguna Island, Efate, Erromango and Tanna (2009-2014). An important finding in the MESCAL Biodiversity Assessments and Technical Reports (2013) was the discovery of an additional 8 species of mangrove found in Vanuatu. This increases Vanuatu's mangrove species inventory from 16 to 23.

Vanuatu has also been fortunate to be given the opportunity to participate in the GEF Evaluation Process; a process which enables countries to reflect on their achievements through the different funding phases that have been provided by GEF.



The Evaluation Process has also had a focus on the results and the sustainability of the projects. The evaluation has come at a time when the country is embarking on several new programs and will be a useful instrument for Vanuatu to utilize to envision where we should focus our efforts in the coming years.

One of Vanuatu's very first milestones was the development of its National Biodiversity Strategy and Action Plan (NBSAP) in 1999. Fifteen years later, the country is now reviewing its NBSAP to meet the 2020 Aichi Targets set at the CBD COP 10 in Nagoya in 2010. Vanuatu is attempting a more holistic and consultative process with natural resource owners ownership being seen at the very beginning of this process.

The Vanuatu Government has been promoting collaboration and partnerships between NGOs, Government agencies and communities in the management and conservation of its natural resources in order to ensure that these resources are used in a sustainable manner.

Vanuatu has also produced some outstanding conservationists in marine biodiversity; one of whom, the country was sad to lose in late 2013. Mr George Pedro, the Environment Officer with the local non-government organization Wan Smol Bag (WSB) is remembered and acknowledged for his contributions to turtle conservation in Vanuatu.

This Fifth National Report is one that has been produced by the Department of Environmental Protection and Conservation, with an aim to build the capacity of officers in the reporting process of multi-lateral environmental agreements, such as the Convention on Biological Diversity.

The report has been divided into three sections:

- i. Status report of Vanuatu's biodiversity
- ii. Mainstreaming Biodiversity in Vanuatu sectoral legislation
- iii. Overview of the Vanuatu's NBSAP Implementation

The production of this report has been made possible through the valuable contribution of many of our stakeholders. We take this opportunity to acknowledge you, and hope that we will continue to work together to conserve Vanuatu's biodiversity.

Thank you.

Mr. Albert Abel Williams

Director

Department of Environmental Protection and Conservation



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Acronyms

AusAID	Australian Agency for International Development
CITES	Convention on International Trade on endangered species of Flora and Fauna
COT	Crown of Thorns
DEPC	Department of Environmental Protection and Conservation
DoF	Department of Forests
EEZ	Exclusive Economic Zone
ENSO	El Nino Southern Oscillation
FADs	Fish Aggregating Devices
FAO	Food and Agriculture Organization
GEF-PAS	Global Environmental Facility Pacific Alliance of Sustainability
GIFT	Genetically Improved Farmed Tilapia
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
IAS	Invasive Alien Species
IRCCNH	Increasing Resilience to Climate Change and Natural Hazards
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resource Management
J-PRISIM	Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries
MSP	Medium Scale Project
NARI-EU ARD	National Agricultural Research Institute- European Union Agriculture and Rural Development
NCS	National Conservation Strategy
NGOs	Non-Government Organizations
PoWPA	Programme of Work on Protected Areas
RAMSAR Convention	Convention on Wetlands of International Importance
REDD+	Reduced Emissions through Deforestation and Degradation
SCBD	Secretariat of the Convention on Biological Diversity
SLO	State Law Office
SPC	South Pacific Commission
SPREP	Secretariat for the Regional Environment Programme
SST	Sea Surface Temperature
TVET	Technical & Vocational Education & Training
UNCBD	United Nations Convention on Biological Diversity
UNDP	United Nations Development Programme
VEU	Vanuatu Environment Unit
VKS	Vanuatu Kaljoral Senta
VNBSAP	Vanuatu National Biodiversity Strategy and Action Plan
VNSO	Vanuatu National Statistics Office



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CHAPTER I: OVERVIEW OF BIODIVERSITY STATUS, TRENDS AND THREATS

1.1 Country Background

Vanuatu is a Y-shaped archipelago located in the Southwest Pacific Ocean at 13-20°S, 166° – 172° E. There is a distance of roughly 1,300 km from northernmost island to the southernmost. The country's coastline extends for 2,528 km long and comprises over 80 islands with a total land area of 12,336 km², set within a 200-mile exclusive economic zone (EEZ) of approximately 680,000km².

Vanuatu's islands are geologically young and were formed during the four main volcanic activity periods. The oldest islands are the Torres Group; this group of islands is part of the most northern province of TORBA. Santo the largest island in the SANMA province and Malekula, the larger island in the MALAMPA province, were formed over 22 million years ago. Pentecost and Maewo, islands are the PENAMA province are the second oldest, and were formed between 4 to 11 million years ago.

Futuna Island as the most eastern island in the TAFEA province situated in the south of Vanuatu and Mere Lava on the most northern province of Vanuatu, TORBA formed between 2 and 5 million years ago. The remaining islands were formed during the last 3 million years. The island building process is continuing and it is thought that about 20 percent of the Vanuatu land surface was formed in the last 200,000 years.

Vanuatu's climate can be defined by two main seasons, the cold (dry) season from May to October and the hot (wet/cyclone) season from November to April. Its position close to the equator however means that Vanuatu has a relatively uniform temperature throughout the year. The warmest month of the year being February and the coolest is August. In the coastal areas, daily temperatures average 26 °C in the hot season with an average maximum of 30°C and an average minimum of 24 °C. Extreme night-time minimum temperature in some coastal areas may reach 13°C.

Rainfall is generally higher in the hot season than in the cold season. The wettest month in Vanuatu is usually March and the driest month is August. During the wet season, rainfall is particularly high on the windward side (southeast parts) of the bigger islands and scarce during the dry season especially on the

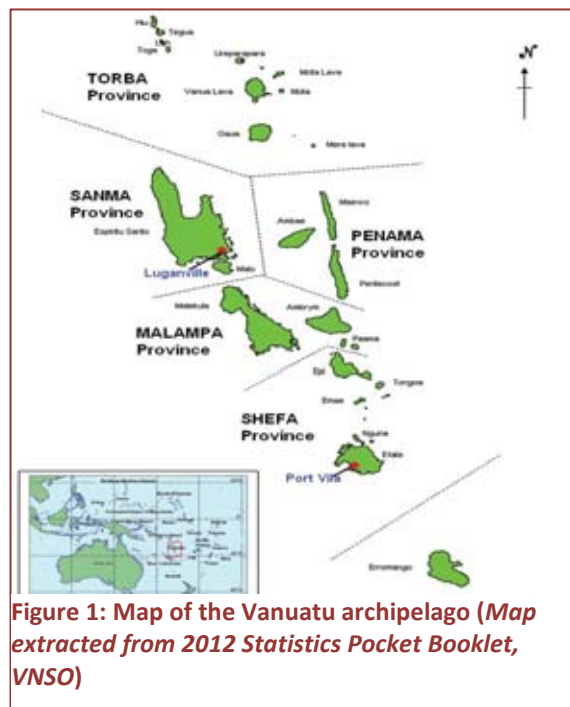
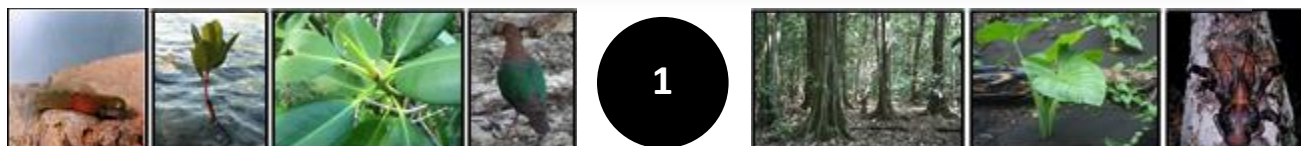


Figure 1: Map of the Vanuatu archipelago (Map extracted from 2012 Statistics Pocket Booklet, VNSO)





leeward sides (northwest part). Rainfall is variable on the smaller islands depending on their location and size. Afternoon showers are still a common feature of the weather in Vanuatu.

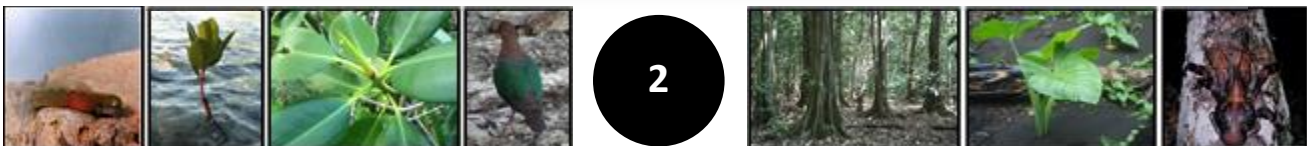
Its geographic location in the Pacific means that Vanuatu is vulnerable to earthquakes, volcanic eruptions, subsequent tsunamis and tropical cyclones. The hot or wet season in Vanuatu, which is from November to April, is also known as the cyclone season. The area of Vanuatu (land and sea) receives about 2-3 cyclones in a cyclone season, and the greatest frequency is in January and February.

In 2013, the Vanuatu National Statistics Office estimated the population of Vanuatu to be 264,652 with a growth rate of 2.3% per annum. Vanuatu's principal domestic exports in 2011 and 2012 were copra, coconut oil and kava. The economy is based primarily on subsistence or small-scale agriculture, which provides a living for over 60% of the population. Fishing, offshore financial services and tourism (with 321,404 visitors in 2012, compared to 2011, which was 248,868 visitors), are other mainstays of the economy. Vanuatu is also culturally diverse with over 110 language and cultural groups (Vanuatu National Statistics Office, 2012).

In general, Vanuatu's larger and older islands support both a greater diversity of terrestrial ecosystems, and a greater diversity of plants and animals (Taiki et al, 2002). Rapid speciation and sub-speciation are able to occur because of conditions such as the presence of bodies of water separating two islands, and rugged interiors that separate catchments and lowland habitats. Frequent disturbance due to the passage of tropical cyclones, earthquakes and volcanic activity also exerts a profound effect on the distribution and abundance of species, especially on smaller islands. There is also a significant variation with latitude, with species that occur at high altitudes in the tropical north occurring at much lower altitudes in the sub-tropical south. Consequently there is considerable variation in the distribution of species within and between islands. As a result, Vanuatu's biodiversity is of particular biological interest for its on-going processes of immigration, range extension and contraction, and sub-speciation (VEU MSP, 2002).

Vanuatu's flora is thought to be more closely allied with that of Solomon Islands (especially the northern- most regions of the country), with some elements from Fiji, and very few from Australia and New Caledonia (VEU MSP, 2003). However, there is considerable variation between different plant families. For instance, 59% of palm genera are shared with Fiji and a lower proportion affiliated with palms in Solomon Islands. Similarly the fauna demonstrates closer affinities with Solomon Islands. Internally there is a biogeographic divide with islands to the north of Efate demonstrating significant differences to the islands to the south. A secondary divide has been described between the islands of the Banks and Torres groups (Tennant, W. J. 1992).

Smaller islands often support quite dense populations, with a heavy use of land systems. With the exception of Tanna, human settlements on larger islands are concentrated on the coastal lowlands, with the rugged mountainous interiors used to a lesser extent. Consequently biodiversity is most at risk in lowland areas and small islands, but remains relatively intact in the high altitude forests of larger islands.





Vanuatu is listed as one of five (5) Oceanic countries important for their wealth of biodiversity. In comparison to these countries however, very little is known about Vanuatu's biodiversity prior to the year 2005. Only a few detailed studies, on few genera, and few studies of the biota of smaller or less accessible islands were carried out.

From the year 2006 until the time at which this 5th national report was being prepared, studies carried out on Vanuatu's flora and fauna include those on:

- Vanuatu Freshwater Fishes and Crustaceans
- Vanuatu Freshwater Eel Fishes Migration to Spawning Spot
- Lake Letas Limnology Study
- Lake Letas Flora Inventory
- Vanuatu Petrel and Storm Petrel Researches on Vanua Lava and Tanna Islands
- Plant Inventories and Rapid Fauna Assessment of Conservation Areas on Santo, Malekula, Pentecost, Nguna Island, Efate, Erromango and Tanna
- Mangrove Taxonomic Studies on Efate, Malekula and Aniwa

In 2006, there was an expedition funded by the French government whose main objective was to study the biodiversity of Santo Island, in the SANMA Province. A review of studies carried out on the flora and fauna of Vanuatu has shown that there are endemic species, rare species and uncommon variants within many of the genera that have been studied in detail.

1.2 Biological Characteristics

1.2.1 Freshwater Resources

Freshwater is an important resource and an essential need for all communities in Vanuatu. However water, and its corresponding environment, remain and continue to be heavily utilised and modified. Water is used in the following ways;

- collected or diverted for household use;
- diverted for traditional taro irrigation/cultivation
- more recently utilised for small scale aqua culturing of introduced fish, *Tilapia natalicus* and freshwater prawn, *Macrobrachium lar*
- Domesticated animals also commonly drink from the accessible surface water.

Freshwater Fauna

Vanuatu in partnership with the French Natural History Museum, conducted studies of the freshwater systems of some major islands to explore the fauna living in these important ecosystems. This information is summarized in the table below:

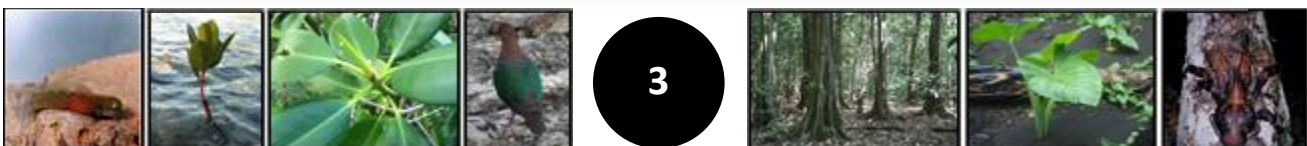




Table 1: Vanuatu's Known Freshwater Fishes and Crustaceans

	Eel Fish	Microphis	Other Fishes	Crustaceans	Endemic	Introduced Species
Number of species	9	6	37	29	12	3

Source: Keith et al, 2010. *Freshwater Fishes and Crustaceans of Vanuatu*

Table 2: Species endemic to Vanuatu or to Vanuatu and New Caledonia

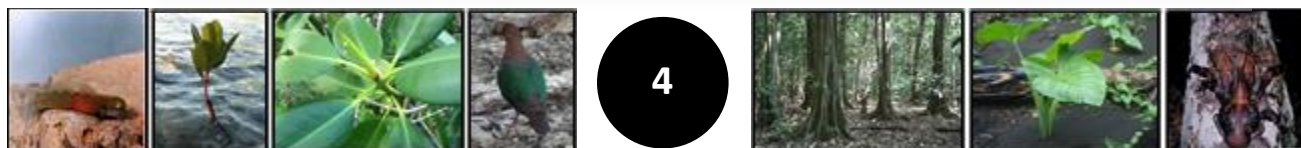
Species	Vanuatu	New Caledonia (Bioregion)	Islands Found
<i>Akihito vanuatu</i>	X		Ambae, Pentecost
<i>Lentipes kaaea</i>	X	X	Santo, Maewo, Ambae, Malekula, Pentecost and Epi
<i>Schismatogobius vanuatuensis</i>	X		Gaua, Santo, Pentecost, Malekula, Epi and Efate
<i>Sicyopterus aiensis</i>	X		Santo, Maewo, Pentecost, Malekula, Efate and Tanna
<i>Sicyopus chloe</i>	X	X	Gaua, Santo and Malekula
<i>Sicyopus pentecost</i>	X	X	Pentecost
<i>Stenogobius yateiensis</i>	X	X	Gaua, Santo, Maewo, Pentecost, Malekula, Epi, Efate, Tanna
<i>Stiphodon astilbos</i>	X		Santo, Pentecost and Efate
<i>Stiphodon kalfatak</i>	X		Santo
<i>Stiphodon mele</i>	X	X	Gaua, Santo, Pentecost, Efate
<i>Stiphodon sapphirinus</i>	X	X	Gaua, Santo, Maewo, Pentecost, Santo and Efate
<i>Rhyacichthys guilberti</i>	X	X	Santo, Pentecost and Malekula

Source: Keith et al, 2010. *Vanuatu Freshwater Fishes and Crustaceans*

Many rivers and streams in Vanuatu have high freshwater fish endemism and a healthy fish population. Subsistence fishing in the most northern part of Vanuatu, in particular the island of Santo includes the endemic fish species of *Sicyopterus aiensis* and *Rhyacichthys guilberti*.

Vanuatu Wetlands Inventory

The Oceania Wetland inventory indicates nine (9) wetland sites, ranging from rivers, streams, lakes, swamps and mangrove ecosystems. The 1993 Vanuatu Wetlands Inventory was revised for updating in early year 2014 in order to include the Wetlands RAMSAR Convention criteria into the wetland types.

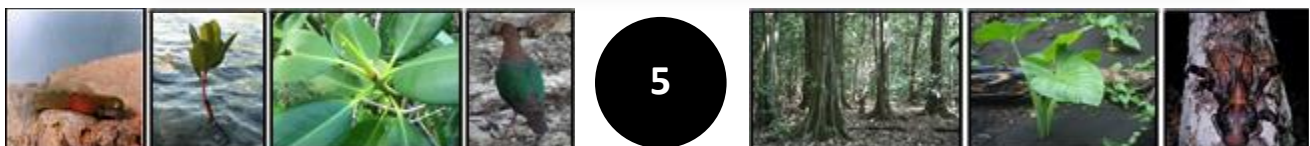




The number of sites will increase following recent freshwater studies of many wetlands sites over the last decade.

Table 3: Vanuatu's Existing Wetland Sites

Sites Name	Island	Size	RAMSAR Wetland Type	RAMSAR Criteria	Management Plan	Status
Alligator River	Vanua Lava	200ha	F: estuarine waters I: intertidal forested wetlands	1, 2	NBSAP	Updating
Nagpen (Selva) River	Vanua Lava	10km	M: Permanent River Zg: geothermal wetlands	1	NBSAP	Updating
Lake Letas	Gaua	8kmx2k m (lake) 1900ha	O: permanent lake M: permanent stream	1, 4, 8	NBSAP and Forest & Protected Area Management Project	Updating
Jordan River Lower Ridges and Flood plains wetland	Santo	Over 1000ha	M: permanent river Xf: freshwater, tree dominated wetlands	1, 2	Part of Vatthe Conservation Area Management Plan	Updating
Port Stanley, Bushman Bay and Crab Bay	Malekula	963ha	A: Permanent marine shallow water B: Marine subtidal aquatic beds, sea grass beds C: coral reefs E: Sand shingle pebbles shore J: Coastal brackish/saline lagoons	1, 3, 4, 8	NBSAP Amal-Crab Bay has Management Plan	Updating
Duck Lake (Emaotul)	Efate	30ha	O: Permanent lake	1, 3	None	Updating
Emaotfer	Efate			YTI	None	Updating
Lake Manaro	Ambae		O: Permanent Lake Zg: Geothermal wetlands	YTI		Updating





Lake Waimemea	Ambae	O: Permanent Lake	1, 3, 4, 8	None	Updating
Southwest Bay Lagoons	Malekula	A: Permanent marine shallow water B: Marine sub-tidal aquatic beds, sea grass beds C: coral reefs J: Coastal brackish/saline lagoons	YTI	None	Updating

Source: Oceania wetlands directory, 1993

RAMSAR Accession

This year (2014), Vanuatu plans to accede to the Ramsar Wetland Convention. This process for Vanuatu's ascension to this Convention is facilitated by the South Pacific Regional Environmental Programme. Once Vanuatu's Inventory of Wetlands Sites has been updated, the DEPC will be able to include, as part of its accession to the Ramsar Convention, a list of national sites.

The national site currently endorsed by the Vanuatu Government is Lake Letas on Gaua Island. It is the largest volcanic lake in the Pacific outside of Papua New Guinea. The Lake Letas is 8 kilometres by 2 kilometres in size, and hosts a high and healthy population of two freshwater eel fish species; *Anguilla marmorata*, *Anguilla megastoma* and the prawn species *Macrobrachium lar*. The surrounding forest is largely in its primary state and has other endemic terrestrial species of birds and reptiles. The lake is approximately 450 metres above sea level and its resources are occasionally fished by the villagers settled at the coastal areas.

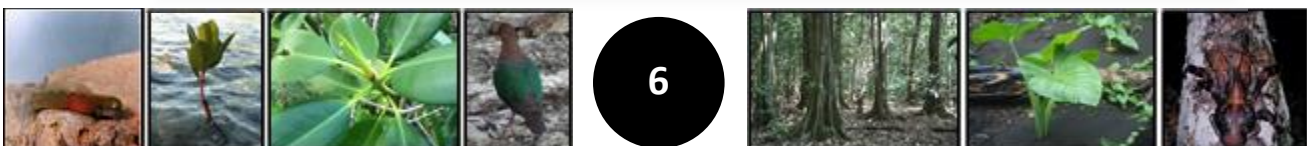
1.2.2 Terrestrial Resources

1.2.2.1. Terrestrial Fauna

Amphibians and Reptiles of Vanuatu

Vanuatu has several species of turtles (Bouchet, Le Guyader & Pascal (Eds), 2011). These species include the Loggerhead, (*Caretta caretta*), Green Turtle (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*) and Leatherback (*Dermochelys coriacea*). In some islands of Vanuatu, sea turtles are hunted as protein for the traditional new yam harvesting season from the month of April to June every year.

Sea turtles are also protected by Fisheries Regulations Order No. 28 of 2009 developed under the Fisheries Act No. 315 of 2009. The traditional harvesting has been accommodated in this Regulation through a quota system that allocates a quota each year for the islands still practicing this tradition. Vanuatu only has one amphibian; the green and golden bell frog (*Litoria aurea*). It is thought that it was introduced by planters in the 1960s from New Caledonia. The amphibian can be found on the islands of Efate, Malekula and Santo.





There is one species of Crocodylidae in Vanuatu, the saltwater crocodile *Crocodylus porosus* that exists on the island of Vanua Lava in the most northern province of TORBA. Vanuatu is the most eastern distribution range of this species.

The Fijian Banded Iguana, *Brachylophus bulabula*, was introduced into Vanuatu from Fiji (where it is native to) in the 1960s. Two decades ago its existence was confined to the Melemaat area, an area located to the southwest of Efate Island. However the iguana has since spread to other parts of the island; *B. bulabula* is now naturalized.

Lizards in Vanuatu are classified into two families, the Gekkonidae and Scincidae. The two families have several species and genera that occur in Vanuatu. This information is summarized below:

Table 4: Herpetofauna of Vanuatu surveyed, studied and documented

Family	Scientific Name	Common Name	Endemic	Introduced
Amphibia				
Hylidae	<i>Litoria aurea</i>	Green and Golden Bell Frog		√
Reptilia Crocodylia				
Crocodylidae	<i>Crocodylus porosus</i>	Saltwater Crocodile		
Reptilia, Squamata				
Iguanidae				
	<i>Brachylophus bulabula</i>	Banded Iguana		√
Gekkonidae	<i>Gehyra mutilata</i>			
	<i>Gehyra oceanica</i>	Oceanic Gekko		
	<i>Gehyra vorax</i>			
	<i>Gekko vittatus</i>			
	<i>Hemidactylus frenatus</i>			√
	<i>Hemidactylus garnotii</i>			√
	<i>Lepidodactylus buleli</i>		√	
	<i>Lepidodactylus guppyi</i>			
	<i>Lepidodactylus lugubris</i>			
	<i>Lepidodactylus vanuatuensis</i>	Vanuatu Gekko	√	
	<i>Nactus malticarinatus</i>		√	
	<i>Nactus pelagicus</i>			
	<i>Perochirus uentheri</i>	Southern Endemic Gekko	√	
Scincidae, Lygosominae	<i>Caledoniscincus atropunctatus</i>			
	<i>Cryptoblepharus novohebridicus</i>		√	
	<i>Emoia aneityumensis</i>	Aneityum Skink	√	
	<i>Emoia atrocostata freycineti</i>			
	<i>Emoia caeruleocauda</i>			
	<i>Emoia cynogaster</i>			





	<i>Emoia cyanura</i>			
	<i>Emoia erroran</i>	Futuna Skink	√	
	<i>Emoia impar</i>			
	<i>Emoia nigra</i>			
	<i>Emoia nigromarginata</i>		√	
	<i>Emoia sanfordi</i>	Vanuatu Green Tree Skink	√	
	<i>Lipinia noctua</i>	Moth Skink		
Typhlopidae	<i>Ramphotyphlops braminus</i>			
Boidae	<i>Candoia bibroni</i>	Pacific Boa		
Elapidae, Hydrophiinae	<i>Laticauda colubrina</i>			
	<i>Laticauda frontalis</i>			
	<i>Laticauda laticaudata</i>			
	<i>Hydrophis coggeri</i>			
	<i>Pelamis platura</i>			

Source: Bouchet P., Le Guyader H. & Pascal O. (Eds), 2011

Vanuatu has a total of Thirty seven (37) amphibian and reptile species, thirty two (32) are native species, one potential species (*Hemiphyllodactylus typus*) and four introduced species.

There are also nine (9) reptile species that are endemic to Vanuatu. Amongst the thirteen (13) native gecko species four (4) (including *N. multicarinatus*) are endemic (33%) and of the 13 native skink species five are endemic (38%). (Bouchet P., Le Guyader H. & Pascal O. (Eds), 2011).

Birds of Vanuatu

Vanuatu has a recorded number of 127 birds (Dutson G. 2011). This includes 16 migrant birds, 11 endemic species, 8 introduced and 1 extinct endemic species, the Tanna Ground Dove (*Gallicolumba ferruginea*). Eight of the 11 endemic species are globally threatened as listed by IUCN Red List. The globally threatened bird species breeding in Vanuatu is shown on the table below.

Table 5: Globally Threatened Bird Species Breeding in Vanuatu

Species	Status	IUCN Threat Status (2006 & 2010)	Key Threats
Vanuatu Megapode, <i>Megapodius layardi</i>	Endemic	Vulnerable	Forest Loss (and overharvest)
Vanuatu Petrel, <i>Pterodroma acculta</i>	Endemic	Endangered	Introduced predators? (..and overharvest)
Polynesian Storm Petrel, <i>Nesofregetta fuliginosa</i>	Endemic	Endangered	(Introduced predators? (and overharvest)
Santa Cruz Ground Dove, <i>Gallicolumba santocrucis</i>	Endemic	Endangered	Introduced predators?
Tanna Fruit Dove	Endemic	Near Threatened	Forest loss; hunting





<i>Ptilinopus tannensis</i>			
Vanuatu Imperial Pigeon, <i>Ducula bakeri</i>	Endemic	Vulnerable	Forest loss; hunting
Green Palm Lorikeet, <i>Charmosyna palmarum</i>	Rare and Endemic	Vulnerable	Forest Loss
Santo Mountain Starling, <i>Aplonis santovestris</i>	Endemic	Vulnerable	Tiny range and population
Rusty-winged Starling, <i>Aplonis zelandica rufipennis</i>	Endemic	Near Threatened	Forest Loss
Royal Parrot Finch, <i>Erythrura (cyaneovirens) regia</i>	Endemic	Vulnerable	Forest Loss
Chestnut-bellied Kingfisher, <i>Todiramphus (Halcyon) farquhari</i>	Endemic	Vulnerable	

Source: Dutson G. 2011 & Bouchet P., Le Guyader H. & Pascal O. (Eds), 2011

Bats and Insects of Vanuatu

There are four (4) fruit bats from the family Pteropodidae found in Vanuatu, the Pacific Flying fox, *Pteropus tonganus*, the Vanuatu fox, *Pteropus anetianus*, the Banks Flying fox, *Pteropus funtadus* and the Fijian Blossom-bat, *Notopteris macdonaldi*. The *P. anetianus* and *P. funtadus* are endemic to Vanuatu while the *N. macdonaldi* is restricted to Fiji and Vanuatu. *P. anetianus* is commonly found in many islands of Vanuatu except for Tanna Island and is possibly due to a historical extinction. *P. tonganus* is a common pacific islands fruit bat and is found throughout the islands of Vanuatu.

The insect insectivorous bats are also surveyed, studied and documented for Vanuatu includes the 10 species found within four families. The Trident Horseshoe-bat, *Ascelliscus tricupidatus novehebridensis* and the Mouse-eared Bat, *Myotis moluccarum* (previously known as *Myotis adversus orientis*) from the family Hipposideridae and Vespertilionidae are endemic subspecies for Vanuatu. The Fijian Mastiff-bat, *Chaerephon bregullae* has a limited range and found in Vanuatu and Fiji only.

The butterflies of Vanuatu were studied in 2004 by John Tennent. The study confirmed a total of 70 species now for Vanuatu which are primarily widespread genera and species. Many of these species have widely dispersed throughout the Pacific region.

1.2.2.2. Terrestrial Flora

Vanuatu Flora compare to fauna is well covered in terms of plant taxonomic studies. The Vanuaflora database has just recently been established in the Department of Forestry's website. The database records a total of one hundred and seventy one (171) families of Vanuatu plants and eight hundred and forty two (842) genera with more than one thousand species. The table below illustrates the plant families that have the highest number of genus and species.

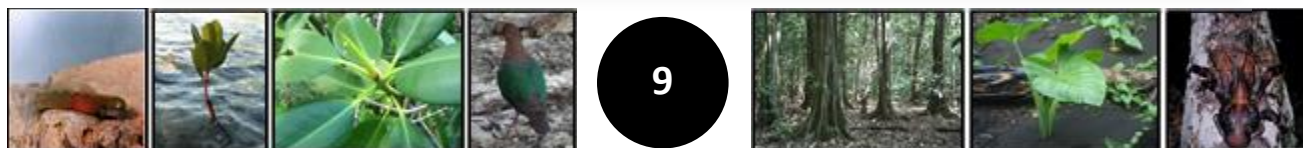




Table 6: Plant Families with Highest Number of Genus and Species

Family	Number of Genus	No of Species
Apocynaceae	36	43
Cyperaceae	16	30
Euphorbiaceae	40	69
Fabaceae	27	52
Indetermineae	29	41
Malvaceae	29	42
Melastomataceae	11	22
Moraceae	30	54
Orchidaceae	35	62
Phyllanthaceae	12	32
Piperaceae	13	25
Poaceae	20	30
Primulaceae	13	21
Pteridaceae	16	20
Rubiaceae	43	92
Rutaceae	22	35
Sapotaceae	10	17
Sellaginellaceae	11	13

There are many endemic flora species but is not clearly indicated in the database. This information will be included when the database is updated. Some information that is known from other existing literatures such as VEU MSP, 2002 and NBSAP shows that Vanuatu has an endemic species of *Pandanus* such as *Pandanus nogarete*, the Kauri species of *Agathis silbae*, the Tamanu species of *Callophyllum neo ebudicum*, the yam species of *Dioscorea hebridensis*, the Ficus species of *Ficus granatum*, the *Macaranga megacarpa*, the Palm tree species of *Carpoxyloon macrospermum*, *Caryota ophiopellis*, *Clinostigma harlandii*, *Cyphosperma voutmelense*, *Heterospathe uniformis*, *Licuala cabalionii*, *Neoveitchia brunnea*, *Physokentia tete* and *Veitchia spp.* It also has 65 Orchidaceae species of which many are endemic. The orchids trade is highly regulated beyond regional protection and all genera are listed on Appendix 1 or 2 of the CITES convention.

Mangrove Species Management

There are twenty three species of mangroves have been recorded for Vanuatu. Where there is sufficient habitat, these occur in distinct zones. The area between the seaward fringe and the high tide mark is dominated by *Brugiera spp*, *Rhizophora spp.*, and *Ceriops tagal* with occasional *Sonneratia alba* and *Avicennia marina*. These species give way at the high water mark to others which grow in brackish or fresh water of beach soaks and river estuaries. These include *Sonneratia caseolaris*, *Xylocarpus granatum* and *Barringtonia procera* (Esrom and Vanu, 1997).

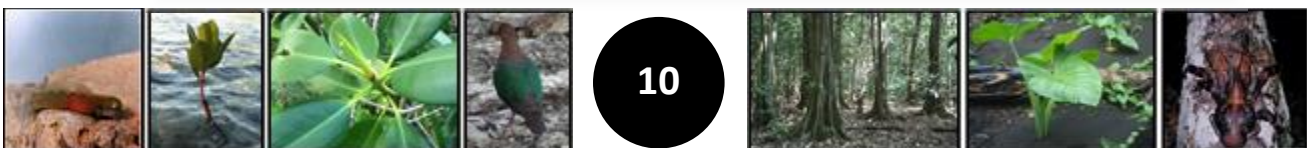




Table 7: Mangrove Species recorded in Vanuatu

Family	Species	Main Habitat
Sterculiaceae	<i>Heritiera littoralis</i>	Mangrove skirt
Euphorbiaceae	<i>Excoecaria agallocha</i>	Mangrove skirt
Meliaceae	<i>Wylocarpus granatum</i>	Mangrove skirt
Rhizophoraceae	<i>Ceriops tagal</i>	Thickets of <i>Ceriops tagal</i> , <i>R. stylosa</i>
	<i>Rhizophora mucronata</i>	Association with <i>R. stylosa</i>
	<i>Rhizophora apiculata</i>	Association with <i>R. stylosa</i>
	<i>Rhizophora stylosa</i>	
	<i>Brugiera gymnorhiza</i>	Association with <i>R. stylosa</i>
Verbanaceae	<i>Avicennia marina</i>	Wooded areas of <i>Avicennia</i>
Sonneratiaceae	<i>Sonneratia caseolaris</i>	Wooded areas of <i>Avicennia</i>
	<i>Sonneratia alba</i>	
Comberetaceae	<i>Lumnitzera littorea</i>	
Lecythidaceae	<i>Barringtonia procera</i>	

(From Esrom and Vanu, 1997 and Baereleo et al, 2013)

1.3 Pressures and Threats

1.3.1 Pressures and Threats to Freshwater Ecosystems

There are some activities that are impacting the freshwater ecosystems and the population or existence of freshwater fauna in Vanuatu. These activities include:

- ❖ Upstream activities that can result in changes in freshwater ecosystems
- ❖ Sand extraction
- ❖ Encroachment on river banks from settlements
- ❖ Development activities

I. Upstream Activities

These activities include logging, gardening and coconut plantations. Most river systems have secondary forests that are a result of different land use activities such as those listed. These activities have contributed to the decrease in the water level of many rivers.

The Sarakata River course has widened due to frequent river bank erosion that has occurred as a result of frequent clearing of vegetation. Other vegetation clearance along the river banks such as that required for improving a tourist trek along as well as near waterfalls; a species currently affected by these activities is the endemic fish, *Stiphodon mele* at the Mele Cascade on Efate Island. This was discovered following a rapid assessment on freshwater fauna carried out in year 2008 by Keith et al.

II. Sand Extraction

Continuous sand extraction along the river mouths on the islands of Santo, Efate and Malekula for infrastructure have changed the water course at estuaries. An example of this is at the Eratap and Mele River mouths on Efate, sites where sand is most frequently extracted. The continuous depletion of sand contributes to coastal erosion, and has an adverse effect on the coastal flora. This further exacerbates





the effects of rising sea level, believed to be brought on by climate change. This activity allows a more frequent influx of seawater that moves further up the river mouth compared to the more natural movement of seawater when the system is in its natural state. This frequent influx affects the water quality, temperature and salinity thereby affecting the distribution of freshwater fauna and flora. Garden crops surrounding the river mouth are also affected as there is an increase in the water level, as well as changes in the water pH.

III. Encroachment of riparian zones by human settlements

The Department of Water Resources establishes riparian zones along rivers and streams. This zone is 50 meters (state source). Encroachment of these zones by human settlements is most common on islands that have freshwater systems. This is evident on Efate, along the Tagabe River. Settlements along the banks of the river use the water for doing their laundry. It is also a means of transport for removing waste. This waste is carried downstream to the river mouth, creating dumpsites for settlers.

IV. Development activities

The Department of Geology Mines and Water Resources noted the changes in the depth of the Port Vila lagoons, Emten and Ekasuvat which are their continuous water quality monitoring sites. The lagoons recorded the deepest depth of 20 meters. Recent monitoring results indicated the deepest depth as 6 meters. This is largely due to a buildup of sedimentation caused by a number of development activities surrounding the area. These developments include reclamations, planting of coconut plantations and rearing of cattle in said plantations that allow sedimentation run off during heavy rainfalls. There are also human settlements along the lagoon area.

1.3.2 Pressures and Threats to Terrestrial ecosystems

The greatest threats to biodiversity are a result of human activities. These activities include:

1. Habitat loss
2. Invasive alien species
3. Urban and agricultural pollution
4. Climate change
5. Increasing shifting agricultural practices

Natural disasters also have a large negative impact on biodiversity. All of these factors can work singly or concurrently with each other.

1. Habitat Loss

Terrestrial habitat loss occurs as a result of

- Conversion of agricultural land for subsistence farming or for cattle grazing as a response to international demand for Vanuatu's high-quality beef.
- Infrastructure and development as well as large scale agriculture along the coastline, forcing the former occupants to move inland and convert more forests for the livelihoods.
- Land lease arrangement and subdivision for residential and industrial activities.

An additional driver on terrestrial habitat loss is Vanuatu's high population growth rate of 2.3% per annum.





2. Invasive alien species (IAS)

Invasive species can have a negative impact on native ecosystems and the species they contain. These impacts may disrupt the ecosystem processes, degrade habitats, reduce biodiversity and introduce diseases to flora and fauna. Island ecosystems appear to be more vulnerable to invasions, as they tend to have fewer species present and are less complex with distance from the continent. Listed are some of the Introduced mammal predators, herbivores and alien invasive plants that are currently affecting the native and endemic species and their habitats. Invasive species are also a threat to lake systems, wetlands, and native freshwater and saltwater ecosystems in Vanuatu.

The Department is currently developing the National Invasive Species Strategy and Action Plan 2014-2020. The species listed below are to be considered as priority IAS in Vanuatu:

- Wild peanut (*Senna tora*)
- Giant African snail (*Achatina fulica*)
- Rats (*Rattus spp.*)
- Feral pigs (*Sus scrofa*)
- Feral cattle (*Bos taurus*)
- Big Leaf (*Merremia peltata*)
- African Tulip (*Spathodea campanulata*)
- Fire Ant (*Wasmannia auropunctata*)
- Yellow crazy ant (*Anoplolepis gracilipes*)
- Fruit flies (*Drosophila melanogaster*)
- Mynah Bird (*Acridotheres tristis*)
- Heliconia rust (*Puccinia heliconiae*)

The Crown of Thorns starfish (*Acanthaster planci*) is native to the Indo-Pacific Region of which Vanuatu is a part of. Although it is native, it is currently acting as an invasive species, and as such, Vanuatu's Fisheries Department has been working with some communities to control its spread.

Community-Based Assessment of Crown of Thorns on Emae Island

Purpose: Research Project to Investigate Potential Effects of Cheap, Easy-to-Find Low pH Solutions for control of COT (*Acanthaster planci*) Starfish

Implementing partners: Institute for Research (IRD) and Fisheries Department of Vanuatu (VFD)

Funding agency: LABEX CORAIL (French)

Objectives: 1) Assess the population density of crown-of-thorns at the island scale using a participative, transect-based approach; 2) Pilot tests the effectiveness of education, training materials and methods on participative COT surveys; 3) Pilot test the effectiveness of acidic injections on living COTs.

Project site: Coral reef directly in front of the Marae Village, Emae Island

Research duration: March 24-28 2014

Findings: 1) this survey emphasized low to very low densities of crown-of-thorn populations around the Emae Island; at Makatea area, the highest number of COTs has been observed (59 specimens, mean 118 COTs.ha⁻¹); the mean densities of COTs remain below the threshold usually considered for outbreaks. 2) Injection with an acidic solution, in this case lemon juice and vinegar, has been shown to efficiently and quickly cause death among the COT populations.





3. Urban and agricultural pollution

Vanuatu's growing population and a tendency for improper waste disposal practices have also had a negative impact on biodiversity.

In 2012 and 2013, results of the Waste Characterization surveys in Luganville, Santo showed that in one year an average of 7000 tons of waste is produced annually. With an annual growth of 4.1%, this number is predicted to increase (Reilly M. 2013). Similar surveys held in Port Vila have shown that 5400 tons of wastes are produced per year. With an annual growth rate of 2.8%, the amount of waste produced is also predicted to increase (Rovo C. 2013)

Since 2011, the DEPC has been striving to develop and implement policies and legislation to assist the country manage its waste issues. With the assistance of SPREP, the Solid Waste Management Strategy 2011-2014 was developed and put in place. The Pollution Control Act 2013 and the Waste Management Bill 2014 were tabled and passed in national parliament and are now awaiting gazettal by the State Law Office. The JICA is currently assisting the DEPC develop the National Waste Minimization Policy.

4. Climate Change

In addition to the prolonged dry and wet periods associated with ENSO, Vanuatu is also subject to other extreme climate events including storm surges, coastal inundation, flooding, landslides, and hailstorms.

Climate change is already having an impact on biodiversity in Vanuatu, and is projected to become a progressively more significant threat in the coming decades. The

The Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries (J-PRISM project)

Duration: February 2011 – February 2016

Donor: Japan International Cooperation Agency (JICA)

Overall goal: to enhance the sustainable management of solid waste in the Pacific Island Countries

Project purpose to be achieved by 2015: Human and institutional capacity base for sustainable Solid Waste Management in the PICs is strengthened through implementation of the Pacific Regional Solid Waste Management Strategy (2010-2015)

Project sites in Vanuatu: Bouffa Landfill, Port Vila, Efate/ Luganville Rubbish Dump, Luganville Santo/ Lenakel Rubbish Dump, Lenakel Tanna

The Climate Section of the Vanuatu Meteorological and Geo-hazards Department in Vanuatu has compiled a training series on Agrometeorology and Climate Change Adaptation. One of the components in the series is training on **"Raising Tilapia in Your Own Backyard"**.

- The training guide gives a brief introduction on the tilapia fish species, its origin and why it was introduced into other countries, in particular the Pacific region.
- It informs people that *"Tilapia is a good quality food and has a firm and delicious flesh. It is also suitable for processing into dried, salted dried, smoked or pickled products"*
- The training guide helps the trainee identify suitable vessels to raise fingerlings (200L drums, old refrigerators and fiberglass tanks), how to make proper adjustments to the vessels to house the tilapia, proper cleaning methods, suggestions on how to feed the tilapia, and how to determine a suitable harvesting time.

In addition it informs people that Tilapia are an invasive species and cautions interested people against releasing tilapia into rivers, streams and other bodies of water.





related pressure of ocean acidification, resulting from higher concentrations of carbon dioxide in the atmosphere, is also already being observed with Vanuatu’s coral reefs inexplicably dying.

The National Advisory Board on Climate Change is coordinating a sector-specific approach to climate change adaptation to the current and predicted climate-related changes. A National Climate Change Adaptation Strategy is under development with assistance from the Secretariat of the Pacific Community (SPC).

5. Natural Disasters

Vanuatu’s location globally makes it vulnerable to natural disasters in particular cyclones, earthquakes, volcanic eruptions and Tsunamis. These natural disasters can have a direct effect on people’s belongings, such as the devastation of their homes, drinking water tanks and crop gardens. The presence of volcanoes indicates a major threat to biodiversity as eruptions destroy habitats and can cause local extinction of many species.

Management Measures

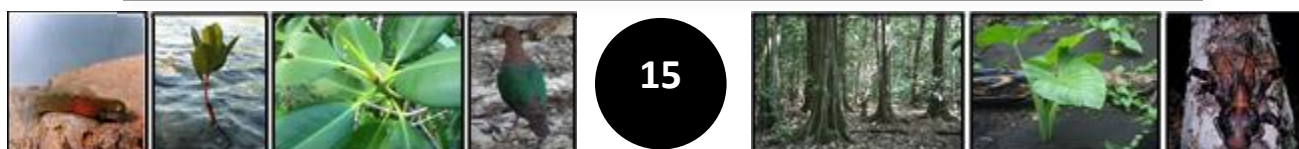
Aquaculture

There has been an increase in freshwater aquaculture for introduced GIFT species of *Tilapia nataloticus* and the prawn species, *Macrobrachium lar* over the last six years, by the Fisheries Department. In addition, since 2013, the Climate Change Section under the Department of Meteorology and Geohazards has been encouraging back yard aquaculture of the introduced fish *Sarotherodon occidentalis* as an alternative source of protein to marine resources in order to alleviate poverty especially during disaster periods. This fish species has since become naturalized. The Department of Environmental Protection and Conservation is aware of these development projects with communities and has advised the concerned agencies to ensure that communities are aware of their negative impact on the natural freshwater ecosystems and the high significant endemism of Vanuatu’s freshwater fishes. The Vanuatu National Biodiversity Strategy and Action Plan highlighted a number of freshwater ecosystems and mangrove areas that are important to protect and restore back their natural state.

Table 8: Places and habitats of conservation significance

Important Places	Places that are damaged or degraded due to human impacts	Vulnerable places
Mangroves on Efate, Malekula, Santo and Vanua Lava	Mangroves throughout Vanuatu.	Mangrove areas
Lake Letas & adjacent areas, Gaua	Rivers on tanna, Efate, Maewo and Vanua Lava & elsewhere	Rivers on Tanna, Efate and Maewo
Petaview waterfall, catchment and inland lakes, Epi	Coastline at Mele Bay and Samoa Point (Sand mining)	Petaview waterfall on Epi and surrounding areas
Rivers on Maewo, Tanna, Vanua Lava and Efate		
Creek Ai River, Efate		

Source: VNBSAP, 1999





There are nine (9) community conservation or protected areas that cover the protection of freshwater systems. Much of these areas are set up mainly for the maintenance and sustainable use of edible freshwater fauna.

The management plans of these areas include measures that protect the endemic species of flora and fauna found in these freshwater ecosystems. Management rules also cover the establishment of buffer zones along the rivers and streams. The Vanuatu Water Resource Management Act No.9 of 2002 has mandated that lakes in the country have a 50 m buffer zone from its shores to further inland.

Over the last five years and more recently awareness of the freshwater ecosystems management through posters were developed and have been distributed nationwide. On Santo

Island for instance, awareness and cleanup campaigns were carried out with communities living within the water catchment areas through the Integrated Water Resource Management (IWRM) project.

**Demonstration Project:
Integrated Water Resource Management (IWRM)**

Implementing Agency: Department of Geology and Water Resources

Project site: Sarakata water catchment, Santo

Project outputs:

1. Development and implementation of a watershed management plan (this can be used as a template for other water catchment areas)
2. Community protected/conservation areas are established at catchment areas; Nabauk and Butmas communities set up protected areas which are now contributing to the clean water quality and quantity of the Sarakata River.

1.4 Status, Trends and Threats by Sector

1.4.1 Forestry Sector

1.4.1.1. Status

Vanuatu has a total land area of 1.23 million hectares and according to the National Forest Inventory (1993) 900,000Ha or 74% of landed area in Vanuatu is covered by different types of forest. Although about 890 000 hectares of this is still natural forests, the production forest occupies only 36 % of Vanuatu’s land area, and only about 20 % of it are of commercial use - mainly due to inaccessibility, low tree density, cultural reasons, or because it has already been heavily logged during the eighties and nineties. While this logging led to severe degradation of the forest, about 50 % of the deforestation in Vanuatu is due to subsistence land use.

(National Forest Policy 2013-2023).

Forests and forest biodiversity continue to play a significant role in the daily livelihood of all rural Vanuatu and are also responsible for balancing the ecosystems that support the terrestrial environment. For this reason, the department is making sure that the biodiversity within these ecosystems is conserved, protected and managed in a manner that will ensure its survival so that it may continue to provide services to communities.

Sustainable forest management is one of the core components of the Department of Forests.





According to the 2009 national census data, up to 80% of Vanuatu’s population live in rural areas. The Agriculture Census of 2007 report indicated that of the 33,879 households surveyed, 95 percent (32,096) of these households were gathering fuel wood/firewood every day. Apart from fuel wood, 56.5% households (19,129) were also involved in gathering other forest products, while 20% (6,748) of the households were involved in tree planting (reforestation) activities. This clearly indicates an imbalance in relation to the sustainable use of the forest resource.

The National Forest Policy 2013-2023 has developed priority areas and activities that will increase management of forest resources to ensure their sustainability.

Reforestation practices have been, and are an effective method for restocking the forest and have been the Forest Department’s main activity for addressing a community’s forestry needs. The Department has gone about empowering communities through skills upgrade and information dissemination, and supply of planting materials.

Reforestation Activities

1. Collection of Seeds and other Plant Materials

This is the first step of reforestation, and is one of the major activities carried out by the Department of Forests. Seeds are collected from sources around Vanuatu, and later distributed to community nurseries and to private individuals. Seeds are also planted at the Department of Forests’ nurseries.

Five tree species have been selected as priority species for reforestation. These are the Sandalwood (*Santalum austrocaledonicum*), Mahogany (*Swietenia macrophylla*), Namamau (*Securinega flexuosa*), Whitewood (*Endospermum medullosum*), and Nangai (*Canarium spp.*).

The five species were selected according to the economic value and local use of each of the species, that is, Sandalwood is traded for its scented heartwood, Mahogany and whitewood are high value commercial timber trees, Nangai is promoted for its nuts as well as timber and the Namamau for its local use for round poles for traditional houses.

In 2012, seeds of these 5 species were collected from Erromango, Tanna, Malekula, Santo, Efate, and Nguna (an off shore island to the north of Efate).

**Project Title:
Enhancing Rural Livelihood Development
through Establishment of Community Forestry
Nurseries**

Donor Agency: New Zealand International Aid and Development Agency (NZAID)

Start date: June 2010 – present

Project site: All six provinces in Vanuatu

Objectives:

- To advance reforestation (Woodlot and plantation establishment) in rural communities through establishment of forestry nurseries
- To improve knowledge of communities on tree planting through training and information dissemination

Three Outputs:

1. Increase & improve the knowledge & skills of selected & surrounding communities on tree planting & reforestation
2. Increase the participation of our rural communities in tree planting
3. For rural communities to be more aware of the importance of tree planting and it’s potential to contribute to the improvement of the rural economy





Table 9: Seed collection sites for Five Priority Tree Species

Seeds	Collection Site
Sandalwood (<i>Sandallum austrocaledonicum</i>)	Erromango, Tanna, Malekula, Santo
Mahogany (<i>Switenia macrophylla</i>)	Efate
Namamau	Tagabe (nursery)
Waetwud (<i>Endospermum medullosum</i>)	Efate
Nangai (<i>Canarium spp.</i>)	Nguna

The Department of Forests was able to establish 12 nurseries from 2010 to date with financial support from the NZAID. Seedlings of the five priority species were supplied to forestry farmers in 2012.

In addition, the Department of Forests has also promoted the use of germinants, either collected from the surrounding areas or from the nursery, as another main source of planting material. Germinants have been used because a lot of farmers either do not have the facilities to germinate seeds, or they do not know how to germinate seedlings. For these reasons, the Department germinates seedlings in their nurseries and supplies the farmers with small germinated plants. In 2012, a total of 54,128 seedlings were supplied to forestry farmers. (*Department of Forests, 2012 Annual Report*)

Table 10: The number of seedlings supplied to forestry farmers in 2012

Species	Number of Seedlings
Sandalwood (<i>Sandallum austrocaledonicum</i>)	35, 415
White wood (<i>Endospermum medullosum</i>)	13, 146
Mahogany (<i>Switenia macrophylla</i>)	3, 518
Nangai (<i>Canarium spp.</i>)	550
Natapoa (<i>Terminalia cattapa</i>)	484
Others	1, 015
Total	54, 128

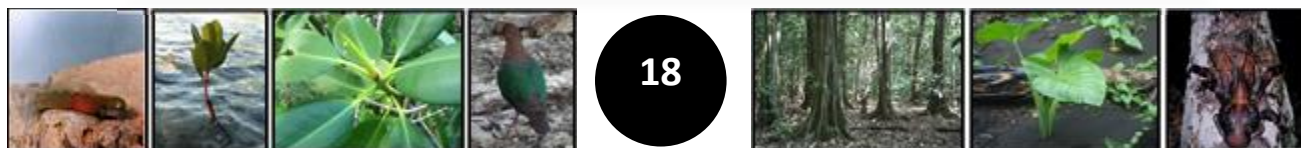
(*Department of Forests 2012 Annual Report*)

2. Training and Awareness

Training of landowners and forestry farmers in reforestation activities (nursery set up and management, woodlot management) has been an integral part of the Department of Forests community service, and are opportunities that give farmers and nursery owners the skills and knowledge to effectively undertake forestry activities.

In 2012, the DoF facilitated training sessions that were aimed at community empowerment, which gave the participants the necessary skills and knowledge required to undertake forestry activities at a local level.

This training strategy has been embarked on by the Department due to lack of government funding to undertake extension services. The majority of these training are undertaken with financial assistance from NZAID (training workshops conducted by projects with training contribution by the Department of Forests staff).





From 2012 to time this report was compiled, the DoF has been fortunate to receive assistance from various donor agencies. There have been six projects that the DoF has been coordinating, most of which are targeted at rural communities.

Table 11: On-going Projects Coordinated by the Department of Forests (as of 2012)

Project Name	Donor	Project Objectives	Operational Location
Cannarium Project	Ausaid	Investigate method of Cannarium nut processing	-
Sandalwood/whitewood germplasm deployment project	Ausaid	Deployment of sandalwood and whitewood germplasm to communities	All six provinces
Community Nursery Project	NZaid	Establish 12 community nurseries with local communities	All six provinces
Forest Protected Area Management	GEF-PAS /FAO	Establish National Conservation/Protected Area	Four Selected Sites – Erromango, Pentecost, Santo, Gaua
Aniwa Reforestation Community Project	UNDP – Small Grant Scheme	Assist Aniwa community to improve vegetation cover through rehabilitation of degraded land	Aniwa Island
REDD + Project	World Bank/ SPC-GIZ	Reduce Emission from Deforestation and Degradation of forest	National

Sources: Department of Forests 2012 Annual Report, <http://vanuatuforestry.com.vu/projects/>

1.4.2.2. Threats

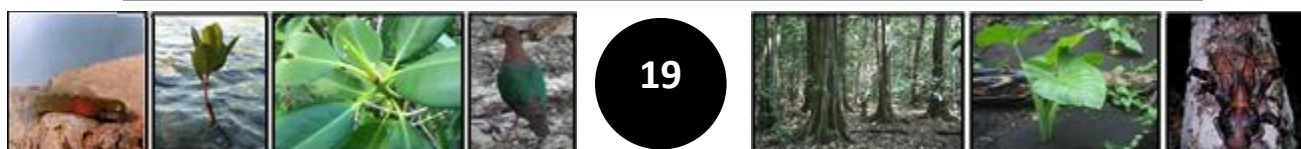
Pressures on forests include:

- Conversion of forests to agricultural land for small scale subsistence farming cattle grazing
- Infrastructure and tourism development and large scale agriculture along coastlines forcing occupants to move further inland (so more forests are cleared for agriculture)
- Vanuatu’s increased vulnerability to natural disasters, such as earthquakes, volcanic eruptions and cyclones
- Additional drives such as a high population growth rate, international economic development and the impacts of climate change

National Forest Policy 2013-2023

Some of the observed changes that have occurred to forests, because of changing weather patterns (including increases and decreases in temperature) attributed to climate change are:

- Higher temperatures and changes in weather patterns which have resulted in a decrease in seed production, and/or the seedlings that have not matured in the predicted time





- A decrease in the distribution of indigenous species decreases (e.g. species previously found in some places are no longer found there) in that area (*Presley Dovo, Jan 2014*).
- The changing temperature and precipitation regimes may influence the productivity of agricultural land and require the adaptation of or introduction of new crops and agricultural production systems.
- The combined impacts of climate change, population growth and soil fertility declines will exert a growing cumulative pressure on the remaining lowland forests of Vanuatu to be converted to agricultural land
- Temperature stress leading to damage of healthy mother trees and changes in both flowering and fruiting seasonality and success.

National Forest Policy 2013-2023

Adaptation and Mitigation Measures to Counteract Effects of climate change in the Forestry Sector

Table 12: Adaptive measures promoted given various climate changes and stressors

Adaptive measures given temperature change and increased rainfall	Adaptations for decreased rainfall and increased temperature	Adaptive measures for soil erosion	Tropical cyclone adaptations	Adaptations for coastal areas	Sea level rise measures
Conduct assessment of species severely affected	Establish sites specific guidance for each species to ensure planting in right location and climatic zone	Conducted logging operations only in dry periods	Plant local species (5 priority local species) that are more adapted to cyclonic stress	Plant coastal trees along the coastline to control erosion	Relocate species of importance to higher grounds
Collect seeds, wildings or cutting from healthy tree species affected	Identify and relocate important species to wetter locations	Discourage heavy machinery operation during rainy seasons	Establish green belts or wind breaks around forest plantations	Establish forest buffer zones between coast and villages	Identify and rehabilitate coastal sites
Raise seeds in a nursery as promoted by DoF	Plant tolerant species of high temperature	Comply with all the Vanuatu Code of Logging Practice (VCLP) requirements and specifications	Establish seed orchards in secured locations	Establish forest plantations in areas less affected by cyclones for improved wood quality	Establish a buffer of coastal species to reduce the rate of coastal erosion





Plant seedlings in other locations not affected	Promote grafting of tree species to ensure fruiting under controlled conditions	Discourage gardening and clearing of vegetation on steep slopes			Develop coastal management plans
Relocate plants affected in swamps and wetland areas to seasonal waterlogged areas	Build storage facilities to store seeds for future use	Re-vegetate and rehabilitate sloping and eroding areas (e.g. with vertiver grass)			
Propagate plants to increase planting materials when long wet seasons affect their flowering	Use the agro-forestry method				
Collect seeds and store them in safe and climate-controlled rooms or coolers to be used during low fruit periods	Undertake awareness on the risks of forest fires				
Undertakes assessments to determine appropriate seedlings or tree species to plant in a climate-affected area	Encourage communities to rehabilitate water catchment areas through tree planting and general awareness				

Source: Vanuatu National Forest Policy 2013-2023

The Vanuatu National Forest Policy 2013-2023 has a policy directive for Climate Change. It addresses Adaptation and Mitigation measures that the Department of Forests has identified that will help to alleviate the pressure produced by the impacts of climate change

1.4.2 Fisheries Sector

1.4.2.1. Status

Vanuatu's 200 nautical-mile EEZ is extensive and encompasses mangrove, sea grass, lagoon, coral and pelagic habitats. Its total coastline is approximately 2,528km in length, and has inshore or shallow water areas that are quite small (in comparison to neighboring Pacific Island countries; which have large areas of fringing reefs, barrier reefs and lagoons). There are about 44,800ha of fringing reef and approximately 2500ha of mangroves, comprised of 23 species (*Biodiversity Assessments Technical Report- Eratap &*





Amal Crab Bay, 2013). Throughout the coastal area, coral reefs, along with river mouths and mangroves, are the biotopes with the highest species diversity in terms of fish, crustaceans and shellfish.

Table 13: New Species records for mangrove Species in Vanuatu

New Species Records of Vanuatu	Confirmed	Area sited
<i>Acanthis ilicifolius</i> (Linnaeus, 1753)	Duke, 2012	Santo
<i>Acrostichum speciosum</i> (Wild, 1810)	Duke, 2012	Malekula
<i>Acrostichum aureum</i> (Linnaeus, 1758)	Duke, 2013	Santo
<i>Lumnitzera racemosa</i> (Wild, 1803)	Duke, 2013	Aniwa
<i>Pemphis acidula</i> (J.R.Forst & G. Forst, 1775)	Duke, 2012	Eratap
<i>Rhizophora x selala</i> (Duke)	Duke, 2012	Eratap
<i>Dolichandrone spathacea</i> (Schumann)	Chanel, 2012	Crab Bay
<i>Barringtonia racemosa</i> (Spreng, 1826)	Duke, 2012	Santo

Source: Baereleo et al, 2013. Biodiversity Assessments Technical Report (Eratap and Amal/Crab Bay)

The coastal zone is home to many endemic, rare and iconic species including the rock lobster, trochus, green snail, crustacean, and coconut crab (*Birgus latro*). Other socio-culturally and ecologically important marine species include rock lobsters (the *Panulirus* sp), sea cucumber, marine turtles (such as the Hawksbill turtle (*Eretmochelys imbricate*), the Green turtle (*Chelonia myda*), and the Leatherback turtle (*Derrmochelys coriacea*) and giant clams (*Tridancids* sp).

1.4.2.2. Trends

Vanuatu fisheries are utilized on subsistence, artisanal and commercial levels. The subsistence fishery targets the inter-tidal zone and lagoon resources and in some cases includes the near-shore pelagic species associated with fishing aggregating devices (FADs). Artisanal fisheries exploit resources that fall into two categories; resources that are marketed and consumed locally and those primarily for export purposes. The main target fishery are inshore tuna fishery associated with FADs, reef fishes including various invertebrates fisheries such as trochus, sea cucumber, lobster and giant clam.

Commercial/Industrial fishery encompasses the tuna fishery; the major targeted species include the big-eye tuna (*Thunnus obesus*), yellowfin tuna (*Thannus albacares*) and skipjack tuna (*Katsuwonus pelamis*). At the moment deep-bottom (snapper) fishery, marine aquarium trade fishery, trochus fishery and tuna export production are sources of revenue for the Vanuatu government. Artisanal fisheries production showed a slight decrease from 2010-2012, while the export of trohus showed a slight increase from 2010-2012. Chilled and frozen tuna are both exported. The total quantity exported showed a slight decrease from 2011-2012, with yellowfin and bigeye tuna making up the bulk of the total 8 species exported - 85% and 12% respectively (*Annual Report, Fisheries Department, 2012*).

The introduction of improved modern fishing gears has further increased the pressure on reef fishery. Freshwater prawns, giant clams, trochus and green snails are fisheries that are over-exploited and are in danger of being depleted.

Many communities in Vanuatu establish small-scale permanent marine conservation areas or periodically opened “taboo” or conservation areas over their marine areas. The Department of Fisheries provides assistance to communities to assess their respective marine “taboo” areas.





Aquaculture

Aquaculture development in Vanuatu covers both the freshwater aquaculture (dealing specifically with freshwater fish and prawn) and a mari-culture component which deals with marine species such as trochus, green snails and giant clams. The focus on aquaculture is related to farming or artificial propagation of aquatic species for the purpose of food security, stock enhancement or aquarium trade.

1.4.2.3. Threats

- Current threats to mangroves; overfishing and conversion of mangrove forest for tourism new villages and access channels.
- Land reclamation/coastal development
- Climate Change
- Invasive alien species

1. Threats to Mangroves

The threats to mangroves include land lease arrangements made by investor with landowners to be subdivided for residential or business purposes. There are also cases of reclamation of foreshore areas for tourism development activities. In addition, some local communities harvest the *Ceriops tagal* for traditional house construction and also sell the harvested wood to interested buyers. Plate tectonic movement is also a threat to mangroves. Plate tectonic movement at the Amal Crab Bay, Malekula saw the *avicennia marina* area uplifted.

2. Land reclamation/coastal development

Foreshore development and other land based activities pose a significant threat to the marine ecosystems observed in our islands. High levels of sediment and siltation in the environment continue to reduce the quality of marine life and habitats in Vanuatu. Reclamations, coastline infrastructure, dredging and coastal developments are some of the exemplar pressures that the marine environment in the main urban areas is currently subject to. Associated or common impacts of such activities include sedimentation, nutrient run-off, pollution/wastewater discharge, habitat destruction, and hydrodynamic erosion of coastlines. The scope of the impacts of such activities is yet to be quantified.

Compliance with environmental and planning legislation in Vanuatu is also one of the key areas which has had a large impact on biodiversity in the urban areas. The implementation of planning tools such as the Environmental Impact Assessment (EIA) Provisions under the *Environmental Protection & Conservation Act [CAP 23]* and other planning and environmental legislation have been integral strategies in trying to maintain the sustainability of Vanuatu's marine environment in particular the developed urban areas. Since the enactment of the EPC Act in 2002, almost 90% of foreshore development proposals have been subject to environmental assessments by the DEPC.

3. Climate Change

Climate change has the following types of impacts on the fisheries sector in Vanuatu:

- ❖ Coral and habitat destruction; this is caused by more frequent cyclones, an increase in sea surface temperature (SST), sea level rise, and coral bleaching.
- ❖ Acidification; acidity affects formation of calcium shells and bones of marine resources
- ❖ Movement and displacement of pelagic species, especially the skipjack tuna
- ❖ Invasive alien species





There has not been any work conducted on any marine alien invasive species as yet. The native crown of thorns starfish (COT) is however subject to periodic control by collecting individuals at various locations at various times when significant population increases or ‘outbreaks’ have occurred. Such outbreaks can be quite dramatic. In mid-2004 on Aore Island and the Million Dollar Point area on Santo over 3,000 COT were collected with funding from the NBSAP Add-on project. In late 2013 the shallow waters of Luganville, Santo yielded some 3.7 tons of COT during 9 days of community effort. Both efforts in 2004 and 2013 were supported by the Department of Fisheries.

Projected Effects on Skipjack tuna

An increase in the SST in the eastern Pacific Ocean means that there will be a shift of the prime feeding areas for skipjack tuna to the east (i.e. there will be less skipjack tuna in our part of the Pacific Ocean)

Projected Effects on Coral Reef and Coastal Fisheries

An increase in SST means that there will be more frequent bleaching, a higher level of acidification, and greater runoff of nutrients due to higher rainfalls and cyclones of greater intensity.

The amount of coastal aquaculture commodities, such as pearls, shrimps and seaweed will decline.

Pond aquaculture commodities such as tilapia will increase because their growth rate will increase in correlation to a higher surface air temperature.

Table 14: A summary of Changes in Production

Resource	West			East		
	2035	2050	2100	2035	2050	2100
Skipjack Tuna	Increase	Negligible	Decrease	Increase	Increase	Increase
Coastal fisheries	Negligible	Decrease	Decrease	Negligible	Decrease	Decrease
Fish in ponds	Increase	Increase	Increase	Increase	Increase	Increase
Other commodities	Decrease	Decrease	Decrease	Decrease	Decrease	Decrease

(Department of Fisheries, 2012)

Adaptation and Mitigation of Climate Change in Fisheries Sector

The following activities are mitigation measures the Fisheries Department has carried out, or is planning on carrying out to assist the communities around Vanuatu:

- A rehabilitation and restocking program of invertebrates e.g. giant clams (*Tridacna gigas*; clams were given to farmers on Moso Island for growth trials), green snail (*Papustyla pulcherrima* ; these were put into a Marine Protected area on Uripiv Island).
- An increased access to tuna for subsistence fishers with low-cost, inshore Fish Aggregating Devices (FADs); in March 2013, chiefs on all villages on the islands of both Nguna and Pele signed agreements with the Climate Change Unit under the Meteorology Department for the use and management of the FAD to promote alternative fisheries.
- Store and distribute tuna and by-catch from industrial fleets to urban areas.
- Develop pond aquaculture.
- Promote storage facilities and post-harvest techniques to minimize of resources.





- Awareness programs promoting aquaculture activities

(Department of Fisheries Annual Report, 2012)

Adapting Coral Reef Fisheries to Climate Change with Fish Aggregating Devices, 2013)

Adaptations for Food Security and Livelihoods

In May 2013, the Vanuatu Fisheries Department, the Secretariat of the Pacific Community (SPC), SPC/GIZ-CCCPIR and AusAID held a workshop that was designed to assist stakeholders in the fisheries and aquaculture sector to identify the best adaptation strategies and supporting policies for minimizing the risks posed by climate change to the plans that Vanuatu has to maximize the sustainable benefits from the sector. Many of the specific management measures are recommended to become a part of Vanuatu’s National Environment Policy (currently in draft form) and will be included in the National Policy on Climate Change & Disaster Risk Reduction.

The plans to ensure that fisheries and aquaculture contribute their full potential to food security are based around providing access to at least present-day average levels of fish consumption (20 kg per person per year) as Vanuatu’s population grows. However, measures needed to increase access to fish to provide up to 35 kg of fish per person each year, as recommended by SPC’s Public Health Division were also considered.

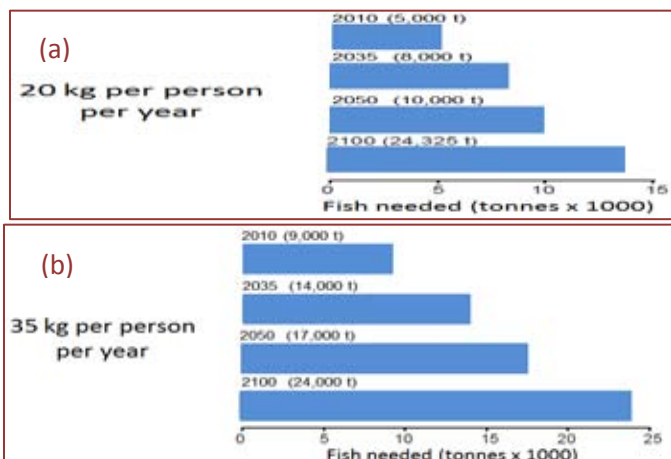


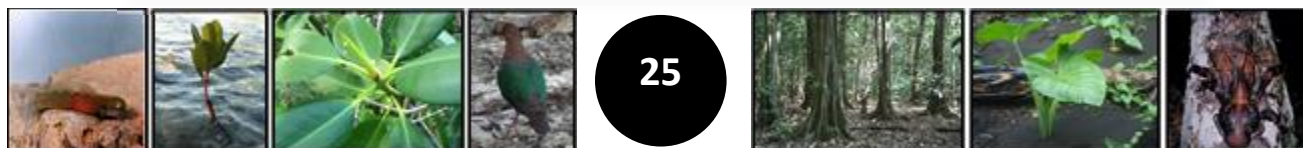
Figure 2: (a) & (b) Quantity of fish needed to supply 20kg and 35kg of fish per person per year for Vanuatu in 2010; and the quantities needed by future populations in 2035, 2050 and 2100. (Source: Priority Adaptations to Climate Change for Fisheries and Aquaculture, Consultation Report, May 2013)

The plans to increase the economic benefits from tuna include, completing onshore facilities for processing and exporting tuna, linking fishing licenses for foreign vessels to onshore processing to maximize landings, and encouraging local participation in tuna fishing through joint ventures.

The adaptations and suggested policies for maintaining the important role of fish (finfish and shellfish) for food security (via subsistence fishing and small-scale commercial fishing) in Vanuatu center on:

1. Minimizing the size of the gap between the fish required for good nutrition and the fish available from coastal (and freshwater) fisheries through appropriate management of coastal (and freshwater) fish habitats and stocks;
2. Filling the gap by increasing access to tuna and boosting freshwater aquaculture.

Different adaptations apply to rural and urban areas





Some of the actions that were discussed to help reduce the gap in fish for food security in rural areas were as follows:

- Manage uses of reefs when high sea surface temperatures are likely to cause coral bleaching by: providing access to bleaching warnings from VMGD; using temporary ‘taboo’ closures; avoiding destructive activities (e.g. walking on reef, netting fish); installing boat moorings to protect sensitive reefs; prohibiting collection of coral; and providing shade over small but important reefs (e.g. at tourist resorts).
- Prevent physical damage (e.g. from boat anchors) to reefs, and nutrient inputs (e.g. from sewage systems and coastal vegetating clearing) to reefs, to limit the conditions for growth of the microalgae *Gambierdiscus* spp which cause ciguatera fish poisoning

In addition, suggestions for actions for adaptations to fill the gap in fish supplies in rural areas were also discussed. Some of the actions suggested were as follows:

- Tuna and other large pelagic fish will be needed to provide most of the additional fish required for food as rural populations grow. They will also be needed as coral reef fish production declines under climate change. Inshore fish aggregating devices (FADs) will have to become part of the national infrastructure for food security. FADs will improve access for coastal subsistence and small-scale commercial fishers to these fish.
- Identify sites and methods for tilapia farming, including backyard tilapia programs which help increase access to fish even in urban areas with little space. Such methods may be favored by the changing patterns of rainfall and warmer temperatures, but note sites where the risks of flooding would cause loss of native fish and prawns from ponds should be excluded

(Priority Adaptations to Climate Change for Fisheries and Aquaculture, Consultation Report, May 2013)

Other Actions for Adaptation Measures; Suggested Strategies to support adaptations for food security and livelihoods:

- Strengthen cross-institutional governance to achieve the ‘ridge to reef’ approach to coastal management and sustainable use of all coastal fish habitats by: (i) building the capacity of management agencies to understand the threats posed by climate change; (ii) empowering communities to manage fish habitats cooperatively; and (iii) changing agriculture and forestry practices to prevent sedimentation and addition of nutrients to coastal waters
- Minimize barriers to landward migration of mangroves and other coastal habitats during development of strategies to assist other sectors respond to climate change.
- Promote mangrove replanting programmes in suitable areas to meet the twin objectives of enhancing habitat for coastal fisheries and capturing carbon.
- Abide by the precautionary principle when making development/harvest/catch decisions affecting climate-vulnerable habitats, locations or species.
- Increase access to tuna for the food security of rural communities, e.g. by using some of the revenue generated from tuna fishing licenses to install FADs for coastal communities, and by limiting how close to shore industrial vessels can fish

(Priority Adaptations to Climate Change for Fisheries and Aquaculture in Vanuatu, Consultation Report, May 2013)





1.4.3 Agriculture Sector

1.4.3.1. Status

The Department of Agriculture & Rural Development (DARD) is the Governmental agency overseeing and managing agricultural programs and activities.

Agriculture is an important sector in Vanuatu's growing society with 75% of the population residing in rural areas which depend entirely on farming activities either for subsistence, livelihood or cash income. However, the official estimate of around 20% for agriculture's share in GDP undoubtedly underestimates DARD's importance to living standards in Vanuatu's development. Thus this sector's contributions to the GDP includes, export of traditional commodities such as organically grown kava, beef, vanilla, coffee & copra. Local production of yams (*Dioscorea spp*), cassava (*Manihot esculenta*), breadfruit (*Artocarpus altilis*), vegetables, fruit and nuts supply the domestic market, with pigs being particularly important for feasts, traditional ceremonies and reconciliation ceremonies (*Tapisuwe et al. 2005*).

1.4.3.2. Trends

At the moment, the agricultural sector lacks policies and/or a legal framework that oversees DARD in addressing conservation and sustainable use of biodiversity. However national work programs and activities are designed to address certain aspects of conservation and sustainable use of resources namely through sustainable farming practices, farming systems and food security. These practices range from promoting alley cropping of *Gliricidia* and primary forest conservation for cultivation of resistant climate variation crops.

Furthermore, through partnership with other national and international organizations, DARD is able to implement activities that are relevant to sustainable farming practices. For instance, the DARD in collaboration with the Vanuatu Agricultural Research Training Center (VARTC) develop crop varieties that are site specific and are trialed through the DARD extension services. Financial assistance from the SPC and National Agricultural Research Institute (NARI PNG) helps to promote sustainable irrigation systems. Subsistence agriculture primarily involves the slash and burn rotation. However, cultivation techniques are becoming increasingly unsustainable as the rotation cycle is shortened due to an increasing population growth rate, the establishment of large plantations, and the leasing of prime land for residential and tourism development. At present in Vanuatu, coconut plantations (74,145ha) and pastures (15,311ha) encompass a much greater land area than the total area for food crops (7,511ha) (*MAQFF Over-Arching Policy, 2012*).

Vanuatu Agricultural Research Training Center (VARTC)

The VARTC implements its agricultural research and development activities for farmers with the guiding principles outlined in the VARTC Act [CAP 286]. The VARTC does not have specific policies, strategies, legislation, management plans that address biodiversity conservation and protection. However their research activities program involves conservation of germplasm, collection of our important food crops (yams, taros, kumala, cassava, bananas, breadfruit, and citrus) and cash crops (coconut, cocoa & coffee).

(*Marie Melteres, 2013*).





Much of their activities involve the collection of planting materials, selection, breeding, multiplication, and distribution to farmers. As a result of their activities, there is now a large diversification of traditional crops in Vanuatu; 170 taro varieties, 48 yam varieties were developed and bred by VARTC to distribute to farmers.

1.4.3.4. Threats

Climate Change

Vanuatu is already experiencing changes that are consistent with expected effects of climate change. Increased temperatures, more frequent and prolonged dry conditions, increased variability of rainfall, salt water intrusion, droughts, soil erosion, and cyclones have increasingly put pressure on crop production.

These temperature rises will cause crops to reach their maximum heat tolerance thresholds and will induce heat stress, wilting, and crop failure, especially in traditional crops such as taro, yam, and cassava.

Dry conditions during El Niño years are most devastating to farming activities in Vanuatu that depend on rainfall. Coastal and low-lying farms are suffering from seawater inundation and intrusion of saltwater into underground freshwater lenses.

The prevalence of wetter conditions in the future would benefit water-sensitive crops such as coconut, breadfruit, and cassava. However, intense rainfall, especially during planting seasons, could damage seedlings and reduce growth for seasonal or annual crops.

Wetter conditions are also conducive to multiplication and spread of plant pests and diseases and more rapid postharvest deterioration of crops. In areas where waterlogging is a problem, increased rainfall could put equally severe pressure on plant growth that leads to lower production. Increased rainfall in good years may offset the effect of warmer temperatures, but a warmer and possibly drier climate would lead to more intense drought in El Niño year. (*Department of Agriculture, 2013*)

Some Proposed Adaptation and Mitigation Measures taken by Agriculture Sector

There are five (5) climate change projects being implemented by the Department of Agriculture.

Table 15: Summary of Projects Implemented by the Department of Agriculture

Name of project	Funding agency	Objectives	Expected outputs	Implementation status
<u>Enhancing Capacity in Vegetable Production</u>	FAO TCP	To improve access to quality vegetable seeds including open pollinated	-Inventory of local popular veg varieties -Access to good quality seeds including OP varieties -Up-skilling farmers in veg production -Identifying suitable varieties for Vanuatu	Inventory completed. Testing of imported seeds is on-going. Training for farmers for seed harvesting and packaging complete. Access to reliable seed sources ongoing. Up-skilling farmers, 4 completed in Vila and Santo. More planned for 2014





<p><u>Generation & Adaptation of Improved Agricultural technologies to Mitigate Climate Change – Imposed Risks to food production within vulnerable small farming communities in Western Pacific Countries</u></p>	<p>BOKU, MAL & DARD Associate; – World Vision, VARTC, VMO, Vanuatu Department of Geology Mining & Water resources</p>	<p>Overall objective To mitigate climate change associated risks to food security and livelihoods for vulnerable smallholder farming communities in Western Pacific countries - PNG, SI and Vu</p>	<p>Expected outputs include: - Suitable target smallholder communities in PNG, SI & Vu identified, needs-assessed & participating in the research & development process. - Sweet potato varieties suitable for cultivation under moisture stress, excess precipitation, or saline soil conditions, piloted & available to target communities in PNG, SI & Vu. - Livestock & fish production diversification options resilient to stress conditions, and reliant on cost-effective locally produced feed/forages piloted & available to smallholder communities in PNG, SI & Vu.</p>	<p>Crop component: Carried out in two communities on Efate and Nguna:</p> <ul style="list-style-type: none"> - Set up evaluation plot to test to test 10 varieties of S. Potato (dry tolerant); - <i>(complete)</i> - Set up Evaluate 10 varieties of cassava (VARTC/DARD) to test best performing varieties for farmers (yield/best performance); <i>(complete)</i> - Distribute improved varieties of S. Potato (early maturing & orange flash); - <i>complete</i> - Distribution of cassava dwarf varieties; <i>(complete)</i> - Distribution of island cabbage (VARTC/DARD); - <i>complete</i> - Distribution of soft & African yam (new varieties); <i>(complete)</i> - Training on yam propagation tech & mini-set + vine cutting - Siviri; <i>(complete)</i> - Middle Bush; Training on value adding on stabl crop – S. Potato, yam, taro, banana, cassava etc... <i>(complete)</i> <p>Livestock component:</p> <ul style="list-style-type: none"> Training on village chicken improvement. <i>(Complete)</i> - Select & support 6 model farmers on fencing, feeds, water container etc... <i>(Complete)</i> - Establishment of model farmers to test different livestock feed – commercial concentrate & NARI concentrate. <i>(complete)</i> - Set up & distribute goat to farmers group on Siviri. <i>(incomplete)</i> - Distribute improve chicken to farmers; <i>(incomplete)</i>
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<p><u>Vegetation and land cover mapping and improving food security for building resilience to a changing climate in Pacific island communities</u></p>	<p>Secretariat of the South Pacific Community (SPC), United States Aid Project 2014 - 2015</p>	<p>1 Improved understanding of climate constraints on food production & increase food security 2 Strengthened national capacity for food security and responses to climate change impacts 3 Improved integration of national and sector climate change strategies</p>	<p>1. Establishment of community nursery ☑ Participation of women in vegetable farming promoted ☑ Livestock production husbandry promoted 2. Strengthened institutional capacity to food security & climate change ☑ Strengthened emergency preparedness ☑ Production of agro-forestry & income generation promoted 3. Establish community aquaculture farming</p>	<p>All project activities are on-going. At the time of this report preparation, no updates on implementation status were confirmed.</p>
<p><u>Community Resilience and Coping with Climate change and Natural Disaster. Component Three: Food and Nutrition Security</u></p>	<p>UNICEF, UNDP and FAO</p>	<p>To demonstrate enhanced short- and long-term community resilience and coping capacity to human security threats associated with adverse effects of climate change and natural disasters with special attention to women, children and other vulnerable groups in Vanuatu and to</p>	<p>Agriculture practices demonstration in hazard /risks prone farm land in 12 project sites. 2.. Increase food production and availability in 12 project sites vulnerable to climate change impacts and natural disasters Activities: 1.1. Prepare Training materials for lead farmers. 1.2. Identify 36 lead farmers and conduct training on establishment of demo plots. 1.3. Provide inputs for lead farmers. 1.4. Organized Field</p>	<p>Activities 1.1 to 1.3 are already implemented and part of them are progressing <i>RESULTS SO FAR:</i> 1. 30 Lead farmers trained 2. 5 Demo plots already set up and 6 demo plots are in progress</p>





		draw lessons from Vanuatu to the rest of Pacific Island Countries and Territories	visits to demo plot sites. 2.1. Select 240 farmers for home gardening 2.2. Provide Timely input support to household to conduct diversified farming 2.3.. Provide ongoing monitoring and technical support	
<u>Increasing Resilience to Climate Change and Natural Hazards</u>	World Bank & Vanuatu Government	Support a phased and consultative approach to develop mechanisms for technology transfer to farmers; and •Ensure improved genetic materials is effectively managed, multiplied and distributed to farmers.	Uptake of improved cultivars and technologies by farmers that enhance income, food security and /or improve resilience to the effects of weather extremes and other impacts of climate Change; •Distribution of improved plant materials; and •Implementation of farmer training and technology delivery systems.	All project activities are on-going. At the time of this report preparation, no updates on implementation status were confirmed

1.4.4 Biosecurity Vanuatu

1.4.4.1. Status

Biosecurity Vanuatu (formerly Vanuatu Quarantine & Inspection Services) is the National Biosafety Focal Point and the Competent National Authority for ensuring national biosafety, which includes biosecurity. It is mandated to protect the borders from incursions of pests and diseases into Vanuatu, as well as manage pests and diseases already present.

The Department achieves both of these objectives by ensuring that imports that pose a risk to local plants and animals are managed at an acceptable level, and through disease surveillance and control programs for pests and diseases already present in the country.

In addition Biosecurity Vanuatu facilitates market access through assurance of pest and disease freedom and food safety. The Department also ensures that Vanuatu maintains its obligations to such international organizations/conventions as IPPC and the OIE.





The Department has five main divisions – administration, border control, plant health, animal health & veterinary services, and meat inspection.

The current programs run by Biosecurity Vanuatu can be summarized as follows:

- ❖ Border control at ports of entry
- ❖ Risk assessment for proposed new imports or species intercepted at the border – based in Port Vila
- ❖ Plant health – primarily the management of pests and diseases affecting plants used for agriculture. Activities include pest management trials, bio-control of weeds, and awareness raising & education programmes
- ❖ Animal health – largely the surveillance & monitoring of pests and diseases affecting livestock, and also veterinary responses to sick animals. (Note: Tuberculosis and Brucellosis were eradicated in the 1990s so Vanuatu’s cattle industry is one of the most disease-free.

Mitigation measures for Pest Control in Vanuatu

The Department of Biosecurity is currently implementing a “Weed Management Project” with financial assistance from the Australian Aid (Ausaid). The overall objectives of the project are to reduce targeted weed infestation through biological means, and to provide training on weed management. Activities for the project include importation of bio-control agents, field releases of these agents in the islands of Vanuatu, and the development of a weed database. Since its inception in 2012, the project has managed to import bio-control agents for the ‘mile-a-minute’ (*Mikania micrantha*), the water hyacinth (*Eichhornia crassipes*) and the *Parthenium hysterophorus*. It is also intending to import the bio-control agent for the ‘Cat’s Claw Creeper’ (*Macfadyena unguiscati*) before the project end-date (October 2014).





CHAPTER II: CURRENT STATUS OF NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS

Vanuatu became a party to the United Nations Convention on Biological Diversity when it signed the convention in 1992, and ratified it in March 1993. Preparing the periodic national reporting to the UNCBD Secretariat and developing National Biodiversity Strategy and Action Plan (NBSAP) are obligations for countries that are party to the convention.

Vanuatu developed its first NBSAP from mid-1997 to year 2000. In November 1999 the NBSAP was endorsed and went through its implementation phase. Some national projects were developed as well as some outside researches were carried out following the priority actions of the NBSAP. The numbers of projects implemented were the Vanuatu Landholders Conservation Initiative Project, focusing on conservation of significant biodiversity and sites on the islands of Gaua, Santo and Tanna; the Forest and Protected Area Management Project on Gaua's Lake Letas, Homo Bay on South Pentecost, Lusunuwe Forest on Northwest Malekula and Erromango Kauri Reserve. Researches include the Freshwater Fishes and Crustaceans of Vanuatu study, and the Santo 2006 Global Biodiversity Expedition. Since then the NBSAP has never been reviewed.

In March 2103 Vanuatu received an enabling fund in March 2013 from GEF through UNEP to review its NBSAP.

2.1. Objectives of the NBSAP Review Project

The overarching objective of the NBSAP Review Project is to integrate CBD Obligations into National Planning Processes through Enabling Activities. The main objectives of the NBSAP Review Project are to assist Vanuatu revise its National Biodiversity Strategies and Action Plans (NBSAPs) to develop the Fifth National Report to the CBD.

The revised national biodiversity strategy and action plans will give direction to the relevant government sectors, NGOs, private sectors and the local communities on how to better manage and conserve Vanuatu's biological diversity.

The revised NBSAP will also link the country's environmental priority development areas to the Aichi Biodiversity Targets under the UNCBD to indicate how Vanuatu as the party to the convention is meeting its targets toward biological diversity conservation.

The review takes place following the following decisions and notifications as illustrated in Table 16:

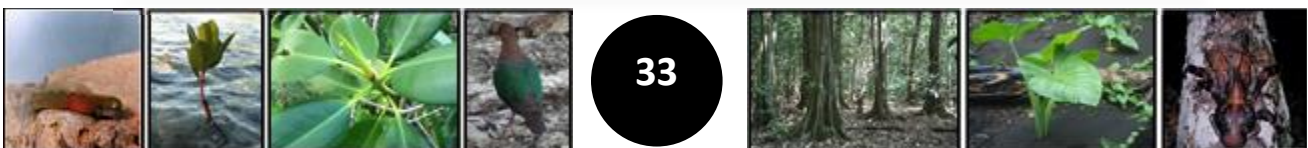
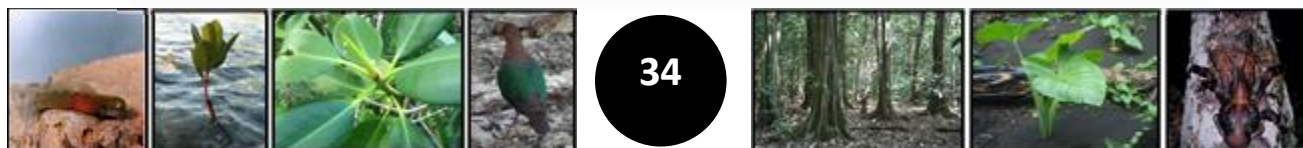




Table 16: NBSAP Review in Response to UNCBD Communications

SCBD Decisions and Notifications	Text	NBSAP Review
COP Decision X/10-National Reporting	<p>Outlines: Obligations of Parties under Article 26 of UNCBD to submit national reports, and to have an update on implementation of the UNCBD as required under Article 23 Adopts guidelines of the 5NR Decides that the due date for the 5NR is 31.03.2014 Requests the GEF to provide financial support for the preparation of the 5NR</p>	<p>Conception of the NBSAP Review Project by VanGov and its implementation, as of March 2013</p>
Notification for 5th National Report and Revision of NBSAPs		<p>The NBSAP Review and 5NR proposal responds to the SCBD Notification³ to Parties to prepare the 5th National Reports and update the NBSAP of 21-Jan-2011. This notification informs Parties that the deadline for submitting duly completed Fifth National R</p>
AICHI Biodiversity Targets	<p>According to COP DEC X/10 7a), the 5NR should focus on the implementation of the SP for Biodiversity 2011-2020, and progress toward the Aichi Biodiversity Targets</p>	<p>The NBSAP Review aims to ensure that Aichi Biodiversity Targets are included into the updated NBSAP.</p>
Poverty Reduction Strategy Papers (PRSPs)		<p>Most of the 30 LDCs and SIDs have developed their initial PRSPs and later versions of them. Component 3 of this project will articulate how the NBSAP will be integrated into PRSPs and MDGs</p>

Source: <http://www.cbd.int/decisions/cop/?m=cop-10>





The support provided by the GEF is enabling Vanuatu to carry out the 5 components:

Table 17: Current Status of the Project Implementation by Components and Activities (measured by percentage achieved)

Cluster	Component	Status (% completed)	Gaps and additional technical support needed (if any)
I Preparation	1. Rapid stocktaking and review of relevant plans, policies and reports	10%	An initial stocktaking of relevant plans, policies and reports was carried out by the 5NR consultants. A regional consultant will be hired in August to review all the documents gathered.
	2. Identifying stakeholders; consultations; and awareness	50%	The main stakeholders are those whose activities impact on the environment, such as the Forestry, Fisheries, Geology, Lands, Bio-Security, Agriculture, Climate Change, Vanuatu Cultural Center and Ngo representatives. Invitations has been send out to 11 selected individuals from the stakeholder organizations to participate in the project committee and so far only 5 have confirm their participation. A meeting will convene in July to provide update to the project committee.
	3. Supplementary studies (eg. the causes and consequences of biodiversity loss highlighting the value of biodiversity and ecosystem services and their contribution to human well-being)	15%	Workshops have been held in the SANMA and the SHEFA Provinces (April 2014), bringing together Officers from stakeholder agencies stationed in the Provinces, such as Forestry, Fisheries and Agricultural Officers. Workshops in the remaining four (4) Provinces are planned for June 2014. Activities are being carried out by NBSAP Review Coordinator.
II Setting national priorities and targets	4. Setting national targets, principles, & main priorities of the strategy though national consultations	30%	All the provinces in Vanuatu have developed their development plans and most of them have considered environment as one of their main focus and have already set their own targets. The NBSAP Review Project has also planned for provincial-target-setting workshops to review the provincial targets already in place, and use the information to set national targets.
III. Developing the strategy and action plan	5. Developing the strategy and actions to implement the agreed targets though national consultations	5%	NBSAP Review will assess those strategies and actions already in place that have been effective in implementation of country activities. This process has already begun, with the Provincial Consultations mentioned earlier. A consultant will be hired to assist facilitate the development of the strategies and action plans in October 2014.





	6. Addressing the application and implementation of the NBSAP at sub-national levels through consultations with sub-national and local authorities	5%	Main stakeholders have been informed, but a formal consultation in the form of provincial and national stakeholder consultation workshops will attain a wider contribution.
	7. Sectoral integration including mainstreaming into development, poverty reduction and climate change plans through sectoral consultations	5%	As above
IV. Development of Implementation plans	9. Developing a plan for capacity development for NBSAP implementation.	30%	The DEPC is currently reviewing its structure and looking at ways to decentralize its operations into the provinces. More stakeholder input will be required to ensure their involvement as they will also contribute to implementation, especially at a Provincial level.
	10. Conducting a Technology-needs assessment alternative: developing a plan for increasing technical capacity.	0%	This activity can be consolidated with the DEPC technology needs assessment. However it would need to include NBSAP stakeholders.
	11. Developing a communication and outreach strategy for the NBSAP.	2%	This activity also could be consolidated with the Marketing and Communication Strategy that the DEPC is currently developing.
	12. Developing a plan for resource mobilization for NBSAP implementation	10%	The review of the DEPC structure includes financial mechanisms that will allow for the effective implementation of the NBSAP. With the development of the new DEPC structure a Resource Mobilization Plan will be developed which will detail the financial mechanisms for effective implementation of the NBSAP.
V. Institutional, monitoring, reporting and exchange	13. Establishing or strengthening of national coordination structures	10%	By setting up the NBSAP PSC this will strengthen its role and major stakeholders will be included in the Implementation plan. The establishment of the NBSAP's Steering Committee will strengthen national coordination, since major stakeholders will also be part of the SC.
	14. CHM development.	3%	The DEPC currently has a website that is being administered by the Department of Lands. This could be further developed to serve the NBSAP purpose after consultations with stakeholders.





	15. Development of indicators and monitoring approach	0%	
	16. Fifth national reports	100%	Report Completed
VI. Adoption by the government	17. Adoption	0%	





CHAPTER III: SECTORAL AND CROSS-SECTIONAL INTERGRATION OR MAINSTREAMING OF BIODIVERSITY CONSIDERATIONS

In the last 5 years Vanuatu has seen a shift from its traditional approaches of biodiversity conservation to a strategic approach with a recent updating of key national policies and development strategies. There has also been a greater degree of collaboration between key government departments and non-government partners as well as the civil society.

The country also recognizes that the new emerging priorities at the national, regional and international levels are important not just to addressing environmental challenges, particularly to the development of biodiversity and conservation in the country, but also in the development of other environmental thematic areas in the country. This is especially apparent in areas such as climate change and waste and pollution. Integration of these priorities into development strategies has become more apparent at all levels.

This section reviews the relevant national policies, plans and legal framework that support biodiversity conservation and their relevancy to other government and non – government institutions and their responsibilities. Its main purpose is to highlight policy links to which the country has between the International Environmental Agreements and National Implementing entities.

3.1 Mainstreaming Biodiversity Conservation in National Policies and Plans

Vanuatu's legislative system has allowed for the development of sector specific policies. These policies generally have been developed in line with government priorities. The main legislation which provides the fundamental means of legislature is the Constitution of Vanuatu;

“ To protect Vanuatu and to safeguard the national wealth, resources and environment in the interests of the present and future generation”, (Constitution of the Republic of Vanuatu, article 7 (d).

Other government policy frameworks which provide the foundation for implementation of the SCBD provisions in the country include the following:

- ❖ The National Conservation Strategy (1993)
- ❖ The Comprehensive Reform Policy (1997)
- ❖ The National Biodiversity Strategy and Action Plan (1999)
- ❖ The Priorities and Action Plan for Vanuatu 2006-2015
- ❖ Vanuatu Forest Policy (2013-2023)
- ❖ Overarching Productive Sector Policy (2012-2017)
- ❖ Millennium Development Goal

3.1.1. The National Conservation Strategy (1993)

Vanuatu's first National Conservation Strategy (NCS) was prepared in 1993 with assistance from SPREP, AUSAID and IUCN. The highest priority areas for implementation included the following areas:

- ❖ improving environmental education and awareness
- ❖ improving legislation and law enforcement
- ❖ strengthening the existing environmental institutions





- ❖ preservation of natural resources and cultural places
- ❖ using resources more efficiently

The NCS strategy established a framework whereby stakeholders could achieve national, regional and international conservation goals.

3.1.2. The Comprehensive Reform Policy (1997)

The Comprehensive Reform Programme (*Government of Vanuatu, 2006*) set common visions for Vanuatu for the next 20 years. One common goal is to protect the natural environment for the sake of indigenous Ni-Vanuatu and the future generations. The review found that the Department of Environment and Conservation (formerly Environment Unit) was implementing the following:

- ❖ identifying conservation areas and sacred places
- ❖ raising public awareness about the importance of environmental protection
- ❖ facilitating community based management of natural resources.

An important achievement of this government policy was that it allowed the transition of the Environment Unit into a fully-fledged Government department with an increase of staff as well as thematic areas to be responsible for.

3.1.3. The National Biodiversity Strategy and Action Plan (1999)

The NBSAP guides the country on measures for conservation and sustainable use of natural resources. It also emphasizes the importance of building in-country capacity for biodiversity conservation at every level and sector: government, province, community and individual. Considerable emphasis is being placed on an improved cross sectoral collaboration as a means of realizing sustainable use of biodiversity within the limited resources and capacities available in-country. This document is currently being reviewed to incorporate the Aichi Targets which will also be mainstreamed into other sectoral policies and legislation.

3.1.4. Millennium Development Goals (2005)

One of the priority areas set out in the Millennium Development Goals for Vanuatu is to 'Ensure Environmental Sustainability'. It aims to integrate the principles of sustainable development into the country policies and programs and reverse the loss of environmental resources (UNDP 2005).

3.1.5. Priorities and Action Agenda for Vanuatu 2006-2015

The Priorities and Action Agenda (PAA) 2006-2015 set out the national strategic priorities which includes 'Primary Sector Development (natural resources and the environment)'. Three important sectors highlighted are Agriculture, Forestry and Fisheries and their priority and strategic areas needed for improvement and increased production. The three sectors account for an estimated 15% of the total GDP and for almost all merchandise exports. Environment and disaster management are also highlighted in the PAA. Environmental management is the responsibility of the DEPC, although other departments including Agriculture, Forestry and Fisheries also have some responsibilities in relation to environmental conservation.





3.1.6. Overarching Productive Sector Policy (2012-2017)

The recently adopted Overarching Productive Sector Policy (2012-2017) is also a policy which has had considerable biodiversity-oriented strategies mainstreamed into it. The policy is being driven by the Prime Minister’s Office with a focus on the three main key productive sectors, agriculture, fisheries and forestry. The main focus of the policy has been food security, livelihoods and the commodity export industries of Vanuatu. The success of these areas is the sustained growth in the productive sector to which is heavily dependent on the sustainable management of the natural resource base.

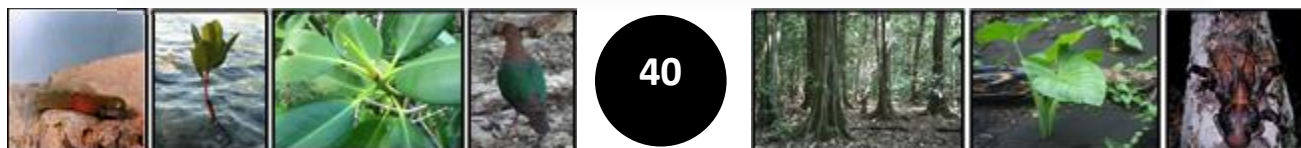
The table below shows a summary of the strategies in this policy that have been proposed as a means to counter effects of natural disasters and climate change.

Table 18: Overarching Productive Sector Strategies to Enhance Resilience to Natural Disasters and Climate Change

<i>DO 5: Enhanced environmental services and sector resilience to natural disasters and climate change</i>	
Strategy	
5.1	<i>"Shift policy focus from crisis management or response to risk reduction and resilience building"</i>
5.2	<i>"Government will advocate and facilitate the formulation of disaster preparedness plans, resource management plans and environmental action plans for the productive sectors.</i>
5.3	<i>"Promote environmentally friendly production systems, including integrated crop management, integrated pest management, agroforestry and organic farming</i>
5.4	<i>"Strengthen regulatory frameworks and enforcement to encourage sustainable farming and fishing, protect natural resources and prevent pollution adopting a polluter pays principle"</i>
5.5	<i>"Support community based-management of in-shore marine resources, both empowering and assisting communities to develop and enforce appropriate conservation measures.</i>
5.6	<i>"Utilize further the already established options to recognize land and marine Protected Areas (PAs).</i>
5.7	<i>"Promote the importance of quantifying production (crops, livestock, fisheries, forests) its changes and the impacts of management and development interventions</i>
5.8	<i>"Strengthen capacity to collect appropriate natural resources data(land, freshwater and marine)to improve land-use planning and fisheries management and to monitor impacts and sustainability of activities in the productive sector</i>
5.9	<i>"Review legislation and regulations with a view to strengthen provisions specifically designed to prevent, deter and eliminate IUU fishing activities.</i>
5.10	<i>"Strengthen capacity for management of fisheries resources to include monitoring, compliance and surveillance of IUU fishing.</i>

Source: Overarching Productive Sector Policy pp 29 -31

The realization of biodiversity promoting ecosystem services is important, in particular with regard to food production, provision of raw materials, recreational opportunities and cultural values. Vanuatu has significant biodiversity both globally as well as nationally. To ensure this status is maintained, it has encouraged communities to use the “Protected Area” system. Under the Environmental Protection Act [Cap 283] this is termed “Community Conservation Area”.





The issue of lack of sustainable and appropriate technologies for sustainable practices has rarely been addressed. These issues are now being addressed in this policy, thereby allowing a clear integration of environmental considerations into the productive sector.

3.1.7. Vanuatu Forest Policy (2013-2023)

The recently adopted Forest Policy of 2013-2023 has ten (10) guiding principles of which four (4) cover, or have links to, biodiversity and conservation. These principals are Sustainable Forest Management, Forest Conservation, Forest Industries and Institutional Setup.

The policy has twenty (20) specific objectives. The first four objectives contribute to sustainable forest management.

A Policy Directive covering Sustainable Forest Management is included in the Policy. This directive covers management of *natural* forests in particular. Management of natural forests is covered by three objectives; Objective D12, on Watersheds and Soils, Objective E15 on Wetlands, Coastal Areas and Mangrove Forests and Objective F16 which encompasses Land Use Planning.

The third Directive in the Forest Policy focuses entirely on Forest Conservation and Environment. Its objectives are primarily focused on Forest Protected Areas and the biological and cultural diversity of forests. The directive allows for environmental considerations to be taken in at a much more sectoral level. This allows for biodiversity consideration focusing on the diversity of Forests as well as Forest Protected Areas.

The directive also allows for the Forestry Department to actively working with relevant stakeholders in Forest Protected Area management, especially in the conservation of the cultural and biological diversity of forests.

Table 19: Vanuatu Forest Policy (2012 - 2023) Policy Directive: Forest Conservation and Environment

Specific Objective: Forests with high biological, cultural, spiritual, and historical values are conserved and protected.	
H. Protected Areas	I. Biological and Cultural Diversity
19. Actively manage and protect 30% of Vanuatu's natural forests.	20. Maintain the biodiversity and ecological integrity of forests and trees.
Establish and strengthen systems of traditional taboos and protected areas to protect biodiversity, ecosystems, environmental services and conserve forest carbon (DEPC, communities, Province, DoF, NGOs, VKS)	Protect and manage endemic, rare, threatened and endangered species in the forest environments (landowner, DEPC, communities, DoF, Province)
Establish and manage Community Conservation Areas (CCAs), as foreseen under the Environmental Management and Conservation Act (2003), to contribute to the conservation of forest biodiversity and forest carbon (DEPC, DoF, Province, NAB, DoL)	Conduct a national biodiversity survey to improve the knowledge on biological values and to identify important biodiversity sites (DEPC, VKS, DoF, NGOs, DoL)
Protect and Manage unique, vulnerable or threatened forest habitats and ecosystems (all stakeholders) Establish clearly defined and regulated buffer zones around protected areas and other sensitive areas (landowners, DEPC, DoF Communities, and Province)	Undertake an archaeological site survey on areas proposed for harvesting of more than 100 ha per year for planted forest programs > 25 hectares per year in accordance with the guidelines issued by the Vanuatu Cultural Centre VKS (VKS, Licensee, Inv)





Enforce protection status of conservation areas (Chiefs, Landowners and DEPC, Province, DoF)	Promote in situ and ex situ conservation, techniques and practices to conserve the gene pool (DoF, Province, NGO's)
	Utilize genetic material exchange agreements to enable biodiversity conservation, ensuring the principles of MAT –Mutually agreed terms and PIC- Prior Informed Consent (DoF, DEPC)
	Develop a biodiversity strategy and action plan (DEPC, DoF)
	Maintain and expand the botanical collections of the National Herbarium & Seed Storage Facility (DoF, VKS. Floral Stakeholders)
	Establish a national botanical garden (DoF, Ind, Others)

Source: Forest Policy 2013-2023 pp 24

3.1.8. National Agricultural Sector Policy

The Agriculture Department has also embarked on a new policy document which also incorporates several biodiversity considerations. Although this document is still in its draft stages, it is aimed for government endorsement by December 2014. This new agriculture policy aims to address the lack of soil conservation issues. It will look at soil biodiversity and conservation as a key area of importance for the country.

The following information is taken from the Draft National Agricultural Sector Policy:

<p>Vision <i>Agricultural food and cash crops of Vanuatu are sustainably and profitable managed, contributing to development for the ongoing wellbeing of all people in Vanuatu by 2023.</i></p> <p>Goal <i>The nation's agricultural resources are managed in an integrated and sustainable manner and provide food and cash crop produce as well as environmental and social services to contribute profitably to income generation, employment opportunities and social wellbeing for all people in Vanuatu, and thus to sustainable economic growth.</i></p>

Table 20: National Agriculture Sector Policy; Goal and Policy Directives for Environmental Protection

<p>Goal 8 Environmental Protection and Sustainable Farming Specific Objectives <i>Environmentally friendly Agriculture</i> <i>Agriculture soils improved and conserved</i></p>		
<p>Policy Directives</p>		
<p>8.1 Mainstream environmental considerations into agriculture practices</p>	<p>8.2 Incorporate sustainable farming practices such as agro-forestry and soil improvement technologies in all agriculture practices</p>	<p>8.3 Practice Organic Farming</p>
<p>8.1.1 Apply environmental considerations such as buffer zones</p>	<p>8.2.1 Promote soil improvement technologies in all agriculture</p>	<p>8.3.1 Incorporate organic production in all agriculture</p>





and wildlife corridors in all agriculture practices	practices (agro-forestry, alley cropping, contour farming, cover crops, and vetiver grass)	practices
8.1.2 Endemic species considered in all agriculture practices		

Source: Draft Vanuatu Agricultural Sector Policy April 2014

3.2 Legislation relevant to Biodiversity Conservation

Vanuatu has four existing legislations that support meeting the objectives of the CBD, in particular, where biodiversity conservation and management is concerned. These legislations are administered by the Department of Environmental Protection and Conservation.

This legislation includes the following:

- ❖ Environmental Protection and Conservation Act [Cap 283]
- ❖ National Parks Act No. of 1993
- ❖ International Trade (Flora and Fauna) Act No. 1989

3.2.1. Environmental Protection and Conservation Act [Cap 283]

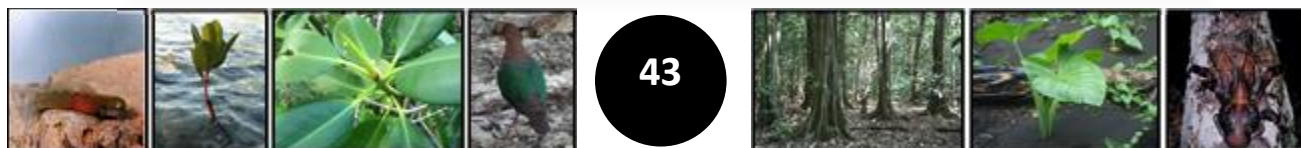
The Environment Act [Cap 283] includes legal provisions for conservation in which it allows communities who have identified endemic or endangered species within their communities to register with the Department of Environment.

Under the EPC Act [Cap 283], there is provision for the set-up of a Biodiversity Advisory Council. This council's members will be appointed by the Minister, and their main role is to assess the research proposals submitted to the Department, and as a Council, either approve or disapprove applications and proposals.

Whilst the Department of Environmental Protection and Conservation's responsibility encompasses all biodiversity and conservation thematic areas, there are two important natural resource sectors that assist with implementing Vanuatu's obligations under the Convention on Biological Diversity. The two sectors are the fisheries sector and the forestry sector. The legislation governing each sector contains provisions for conservation and biodiversity.

3.2.2. The Environmental Protection and Conservation Act [Cap 283], the Fisheries Act [Cap 315] and the Forestry Act [Cap 276].

Vanuatu has three different approaches for managing conservation or protected areas. This is because there are three different existing legislation under three (3) separate sectors; environment, fisheries and forestry. The Department of Environmental Protection and Conservation is now working with relevant natural resource sectors to ensure that there is one national protected or conservation area management system through the Programme of Work on Protected Area (PoWPA) project. This may lead to amendments in existing relevant legislation to allow the one national process to be adhered to so that there is a consistent national coordinated approach for legal recognition of protected or conservation areas. The Environmental Protection and Conservation Act [CAP 283] allows legal protection of all existing forms of conservation or protected areas right to sacred sites and tabu areas.





3.2.3. Other relevant legislations

There are also other important legislations in the country with relevance to biodiversity and conservation.

Water Resources Management Act 9 of 2002

This Act allows for the designation of policies to protect water resources. It also has the provision for water conservation zones to be established, which again preserves freshwater ecosystems for the country and safeguards freshwater ecosystems.

Part Four (4) of the Act is concerned with water resource management. Within this part there are two (2) divisions; one of which is concerned with the set-up of a national policy and resource management plan for the effective implementation of the Act. The second division is for water supply conservation and development.

Geology and Mines Legislation

The legal framework governing mining activities in Vanuatu is as follows:

- ❖ The Mines and Minerals (Amendment) Act No.19 of 2013 [Cap 190]
- ❖ Quarry Permit Regulation Order No.8 of 2005
- ❖ Quarry Act No.9 of 2013

The Mines and Minerals Act [Cap 190] is the principle Act for mineral extraction in Vanuatu. Mining activities in Vanuatu are regulated through a licensing system under CAP 190. There are two licenses that are required prior to any mining activities. The first is the “Prospecting License”. This is needed to ensure that there are sufficient amounts of the mineral the applicant wants in the area it is interested in. Once this license is obtained, the applicant then needs a “Mining Production License”. There is also a requirement to adhere to other legal requirements stipulated by the laws of Vanuatu including the requirement to obtain the stipulated environmental approval stated under the Environmental Protection and Conservation Act [CAP 283].

Before obtaining a “Quarry License”, the DEPC is required to carry out a preliminary environmental impact assessment on the proposed operation. It is a requirement under the current Mines and Minerals Act as well as the Quarry Act to carry out Preliminary Environmental Impact Assessment prior the granting of licenses by the Commissioner of Mines Environmental assessments must be carried out for all quarrying activities including coastal sand extraction and limestone quarry operations. Monitoring and compliance for both licenses are usually jointly carried out by DEPC Compliance Section and Department of Mines Compliance Section, as license conditions incorporate both environmental requirements under the EPC Act [Cap 283] and the requirements under the Mines and Minerals Act [Cap 190].





Table 21: Measures taken by the Department of Geology, Mines and Water Resources (DGMWR) and the DEPC to ensure sand mining and quarry operations are carried out in a sustainable approach

Operation	Measure and conditions employed to reduce environmental impacts
Coastal-Sand Mining	<p>Licenses were issued on an occasional basis to allow time for recovery of sand prior to issuance of another sand extraction permit</p> <p>Only certain machinery is permitted for use during extraction. Extraction is only permitted at the river mouth and not in other areas along the coast</p> <p>A license holder, who is the resource owner, is given the responsibility by the licensing authority (DGMWR) to provide supervision at the extraction site of the quantity of sand that are transported from site by operators during the period of extraction</p> <p>Compliance monitoring work on operations has increased to ensure permit conditions are adhered to at all times. Compliance monitoring is also carried out outside normal working hours (in Vanuatu, this is 7:30am-4:30pm)</p> <p>Operators who are in non-compliance are penalized when permit conditions are not adhered to</p> <p>Other enforcement actions include; stop work notices, restoration of sites, seizing of machineries</p> <p>Exploring alternative sources of sand for instance encouraging terrestrial sand mining to discourage coastal sand mining</p> <p>Collection of baseline data to ensure that biodiversity is known prior to extraction works and to develop management measures to manage the biodiversity during operations</p>
Quarry operations	<p>A "Quarry Management Plan" must be developed and submitted to the DGMWR and an "Environmental Management Plan" to the DEPC</p> <p>Operators who are in non-compliance are penalized when permit conditions are not adhered to</p> <p>Other enforcement actions include; stop work notices, restoration of sites, seizing of machineries</p> <p>Collection of baseline data to ensure that biodiversity is known prior to extraction works and to develop management measures to manage the biodiversity during operations</p>
Deep Sea Minerals (NEW)	<p>Deep Sea Mineral Policy developed having a section on Sustainable Environmental Management.</p> <p>Environmentalist onboard with prospecting licensed companies during exploratory exercise to collect data on deep sea biodiversity as very little is known about deep sea environment.</p>

The Mines and Minerals Department recently established the 'National Offshore Mineral Committee' to look into legislating Deep Sea Mineral activities. A new Deep Sea Mineral Policy has been developed to guide and promote the development of offshore mining in Vanuatu.

The Deep Sea Minerals (DSM) policy also makes provision for baseline data collection and also a provision to preserve some areas of the country for biodiversity protection.

Presently, there is a lack of complete scientific knowledge about the deep sea environment and the potential scope, magnitude or duration of the impact of seabed mineral activities. The Government is





however committed to applying the 'precautionary principal approach' to seabed mineral developments. Prospecting licenses for deep sea minerals were issued to companies to prospect for potential deep sea mineral sites within the territorial waters of Vanuatu.

Prior to advance exploration phases, the sea bed biodiversity must be surveyed and documented. This will be used as baseline information for the Environmental Impact Assessment (EIA). An Officer responsible for environmental impact assessments within the Department of Environment will be part of the research /prospecting team to collect information of Vanuatu's deep sea environment. Vanuatu's deep sea environment has not been fully explored as it is a costly exercise to do.



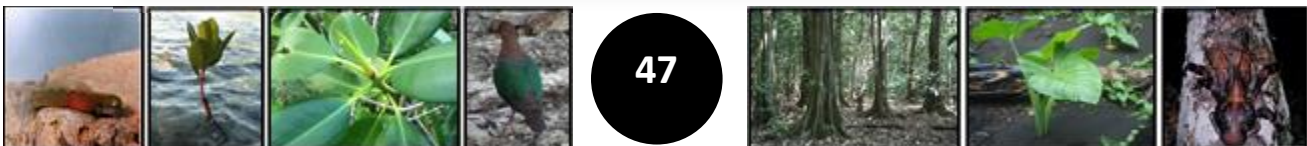


CHAPTER IV: CONCLUSIONS: PROGRESS TOWARDS THE 2010 TARGET, RELEVANT AICHI TARGETS AND IMPLEMENTATION OF THE STRATEGIC PLAN

4.1 Progress towards targets

The National Biodiversity Strategy and Action Plan is at its initial stage of reviewing. Two provincial consultations have been undertaken to remap their important biodiversity and ecosystems. A national workshop is planned towards the end of 2014 that will allow the establishment of national targets, while also taking into consideration the outcomes of the provincial consultations.

The Marine and Coastal Biodiversity Management in Pacific Islands Countries (MACBIO) Project will begin its inception shortly in Vanuatu. Its regional implementing agency is the IUCN and will be housed under the Department of Environmental Protection and Conservation. The MACBIO project is funded by the GIZ, and, while in implementation will be setting national targets for Aichi Targets 2, 11, 14 and 15. These targets will inform the NBSAP project review.





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