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CONVENTION ON BIOLOGICAL  
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Third meeting

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Item 4 of the provisional agenda\*

**COMPOSITE REPORT ON THE STATUS AND TRENDS REGARDING THE KNOWLEDGE,  
INNOVATIONS AND PRACTICES OF INDIGENOUS AND LOCAL COMMUNITIES**

***Regional report: Pacific***

*Note by the Executive Secretary*

1. The Executive Secretary is circulating herewith, for the information of participants in the third meeting of the Ad Hoc Open-ended International Working Group on Article 8(j) and Related Provisions, the regional report for Pacific on the status and trends regarding the knowledge, innovations and practices of indigenous and local communities, which was used as input to the first phase of the composite report on the same subject (UNEP/CBD/WG8J/INF/1).
2. The report is being circulated in the form and language in which it was received by the Secretariat.

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\* UNEP/CBD/WG8J/3/1.



## PACIFIC REGIONAL REPORT

### THE STATE OF RETENTION OF TRADITIONAL BIODIVERSITY-RELATED KNOWLEDGE IN AOTEAROA/NEW ZEALAND AND PACIFIC ISLANDS COUNTRIES

#### 1. INTRODUCTION

This report covers Aotearoa/New Zealand and the following Pacific Island Countries (PICs): Cook Islands, Fiji, Kiribati, Niue, Federated States of Micronesia, Republic of Palau and Samoa. The range of information available on each of these countries has varied to a greater or lesser extent and in some cases it has proven challenging obtaining up to the date relevant information. So there may be some errors and omissions. However, the author believes that the following report portrays in a broad sense an accurate picture of the general status and trends regarding the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biological diversity in the Pacific and the efforts and measure being taken to protect, promote and facilitate the use of traditional knowledge in the countries covered by this report.

This phase of the exercise has highlighted the need to undertake further in depth research and to conduct meetings and consultations with the local communities, relevant NGOs and government officials in order to obtain a more complete picture of this subject matter.

#### **An Overview of the Pacific region**

The Pacific region covers a vast expanse of ocean some 10 million square kilometres in area. There are 22 countries in the Pacific region. Aotearoa/New Zealand and the Pacific Island countries share a common Polynesian and Melanesian heritage and many of the customs and traditions relating to the land and the sea are similar throughout the region. One such customary practice is known in Aotearoa/NZ as *rahui*, in the Cook Islands as *ra'ui* and in Fiji as *tabu*. This custom involves the placing of a prohibition or restriction on the taking of natural resources that have been depleted from an area of the land or marine environment for a specified period of time until those resources are replenished. Similar practices are observed by other PICs. This is a common traditional method used in the Pacific for preserving and maintaining biodiversity for enjoyment by present and future generations and is still in practice today.

Pacific Island peoples, like indigenous peoples worldwide, consider themselves an integrated part of their natural world. Indeed, to Pacific peoples, the Pacific Ocean or *Te Moana Nui a Kiwa* as it is known throughout the Pacific is their home. This relationship with the ocean has been forged over millennium of navigation and voyaging which has earned the Polynesian and Melanesian peoples the reputation as some of the world's finest ocean navigators having successfully settled the hundreds of Islands in the vast Pacific Ocean 1,000 years before European navigators began embarking on their great voyages of exploration.

NZ and the Pacific Island countries are endowed with rich and diverse terrestrial and marine biodiversity. There are some 2,000 different types of ecosystems to be found throughout the South Pacific and on some islands 80% or more of the species are endemic to those islands<sup>1</sup>. The Pacific also has the most extensive coral reef systems in the world, many of which are under threat from coral bleaching.

With the exception of Aotearoa/New Zealand, Pacific Island countries are largely developing economies. Due to the rich diversity of flora and fauna in the Pacific, there is increasing demand for access to genetic resources and associated traditional knowledge. Over the past 10 years this has resulted in calls by indigenous peoples within the region for a moratorium to be placed on bioprospecting of genetic resources (including patenting of the human gene sequences) and the development of *sui generis* systems

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<sup>1</sup> Draft Issues and Options Paper for Access to Genetic Resources and Benefit Sharing in the Pacific Island Region page 2.

for the recognition and protection of traditional knowledge<sup>2</sup> (Mataatua Declaration, 1993). In recent years this has manifested itself in regional cooperation in developing a draft model law for protection of traditional biological knowledge, innovations and practices, work on drafting alternative IPR laws better suited and adapted to local Pacific communities, proposed legislation dealing with regulation of bioprospecting, draft codes of conduct and a raft of other policy and legislative initiatives relating to traditional knowledge and environmental issues. However, most of these initiatives and policies are still largely work in progress and are yet to be formalised into law.

With the exception of New Zealand, most of the land in Pacific Island countries is held under customary ownership. This means that land is communally owned by kinship clans, tribes or extended families but most PICs also have publicly owned or Crown land and some individual freehold title. Customarily, land was not “owned” in the sense that that term is understood in western law but rather the relationship between the people and the land was one of mutual respect and guardianship. The land was held and utilised for the benefit of all although rights to land and resources were vigorously protected. Because of the complexities associated with communally owned land, it is usually underdeveloped and consequently a high level of biodiversity is often found on customary lands.

The following table indicates the level

**Table 1<sup>3</sup>.** Land tenure in PIC Parties to the CBD:

	Area (km <sup>2</sup> )	Land Tenure
Cook Is.	237	All land is vested in the Crown, however this is without prejudice to the title of owners of freehold land or title held by customary land owners prior to 1915.  Most land is still therefore held by the original owners under customary law.
Federated States of Micronesia	701	The Constitution gives no power over land law to the national government; land law is a matter left to the states to determine.  The states vary in the extent to which customary law is recognised and applied.
Fiji Is.	18,333	Land falls into 3 basic categories: approximately 82% is customary or native land (ownership is vested in mataqali or kinship groups) 10% is freehold and 7.5% is State land.  All customary land is administered by the Native Land Trust Board. Rabi island is vested in freehold in the council of leaders. Rotuma island is held according to Polynesian customary land holding.
Kiribati	811	The land law aims to retain and enforce customary rules of land tenure.  Interests and rights in land are governed by custom as modified by legislation, principally the Native Lands Ordinance and the Laws of Kiribati Act 1989.

<sup>2</sup> Mataatua Declaration (1993), initiated by the Maori tribes of Mataatua and signed up by [x number] of indigenous peoples organisations from around the world.

<sup>3</sup> Draft Issues and Options Paper for Access to Genetic Resources and Benefit Sharing in the Pacific Island Region, page 5

	Area (km <sup>2</sup> )	Land Tenure
Marshall Is.	181	Considerable land has been alienated for expatriate settlement, businesses and military uses. While there are no laws for the return of these lands, section 13 of the Real and Personal Property Act provides that land may be owned only by citizens or by corporations wholly owned by citizens.
Nauru	21	Most land is owned by Nauruans according to custom with the exception of a few allotments owned by the government, the Phosphate Commission and missions.
Niue	259	Land is vested in the Crown but is held by mangafaoa (family units) for and on behalf of all its members.
Palau	488	Under Title 39 of the Palau National Code, only citizens of Palau or corporations wholly owned by citizens may own land in Palau.
Papua New Guinea	462,243	97% of land in PNG is held under customary tenure.
Samoa	2,935	All land is vested in the State and is classified as customary land (about 85% of the total land area), freehold land or public land.
Solomon Is.	28,370	90% of land is customary.
Tonga	747	All land is vested in the sovereign on behalf of the Kingdom. All other interests are life interests in favour of individual persons. There is no provision for freehold in fee simple.
Vanuatu	12,190	All land belongs to the indigenous custom owners and their descendants.  Only indigenous citizens who have acquired their land in accordance with a recognised system of land tenure have perpetual ownership of their land. Nevertheless, government may own land acquired by it in the public interest. Also, Parliament after consultation with the national Council of Chiefs, may make different provisions for different categories of land.

(Sources: Ntuny: South Pacific Islands Legal Systems; Zorn: Custom & customary law.)

For Pacific Island peoples, the land and the sea are an extension of each other. As one commentator has noted:

“The marine environment is viewed conceptually as forming part of the land, and the principles of marine tenure differ little if any from land tenure. ...land and all that grows upon it, together with the people who derive their sustenance from it, are one and indivisible in many South Pacific Island communities. Adjacent reefs and intervening lagoons, mangroves and estuaries

/...

are seen as integral components of that land, not as distinct entities separated from land from a certain tidal level”<sup>4</sup>.

The gods of the land and sea are distant ancestors of Maori and Pacific Islands peoples and are deserving of great respect. They consider themselves kaitiaki or guardians of the natural world gifted to them from the gods and inherited from birth. Thus there exists within their traditional cultures, inbuilt values and codes of behaviour for living and interacting with their natural world. However, as will be seen from the following pages, the influence of western culture on these Island communities has greatly contributed to the loss of traditional knowledge and associated value systems.

However, there has been a growing awareness throughout the Pacific in recent years of the need for regional cooperation for the protection of traditional knowledge and customary practices in relation to biodiversity. Key regional initiatives in the Pacific include the South Pacific Regional Environment Programme (SPREP), the Secretariat for the Pacific Community, Forum Fisheries Agency and regional meetings on traditional knowledge and biodiversity held around the Pacific.<sup>5</sup> One of the key projects undertaken by SPREP is the Capacity Building for Environmental Management in the Pacific whose stated objective is to:

“Integrate traditional and non-traditional resource management systems with the national environmental management institutions, local Government operations and within the community”.

This project is designed to encourage Pacific Island countries to utilise their natural resources in a sustainable manner. A subsequent project proposed to follow on from the CBEMP will focus on using traditional knowledge systems to develop policies and legislation for conservation and sustainable use of biodiversity in the Pacific<sup>6</sup>.

Another key SPREP initiative is the publication of the Action Strategy for Nature Conservation in the Pacific Island Regions 1999-2000 which includes as one of its major objectives:

“To involve and support communities, resource owners and resource users in co-operative and sustainable resource management that recognises and strengthens the rights and customs of local people as a basis of promoting environmentally sustainable and equitable development”<sup>7</sup>.

The Action Strategy lists the following key actions for achieving these objectives:

- to identify and document the wider use of customary knowledge and environmentally sound customary practices, including the medicinal uses of fauna and flora [and to] integrate appropriate local knowledge and practises into resource management and conservation area planning;
- to promote and support the maintenance, revival and application of traditional environmental knowledge to modern natural resource management in local communities.

While there has been a great deal of discussion and awareness raising on the importance of policies and processes for protecting traditional knowledge there remains a great deal of work to do before these discussions and draft working papers translate into legislation and other forms of legally enforceable mechanisms. While there are regional initiatives being pursued in the Pacific such as those mentioned above, there is also a diverse range of individual country responses, which are discussed in the following sections which deals with the issues under each of the relevant project headings.

<sup>4</sup> Draft Issues and Options Paper, p 7.

<sup>5</sup> Three such conferences in recent years include the UNESCO Pacific Sub-Regional Expert Workshop on Indigenous Science and Traditional Knowledge held in Wellington, New Zealand in September 2001; The Building Bridges Using Traditional Knowledge conference held in Hawaii in May 2001 and the First Regional Session of the Global Biodiversity Forum for the Pacific held in Rarotonga in July 2002 which held a workshop on Traditional Knowledge and Traditional Resource Management and Biodiversity. The Pacific GBF was held in conjunction with the Seventh Pacific Islands Conference on Nature and Conservation and Protected Areas;

<sup>6</sup> Draft Issues and Options Paper, p 14.

<sup>7</sup> Action Strategy for Nature Conservation in the Pacific Islands Region, 1999-2000, p [x].

## 1.1 Country Overviews

### *Aotearoa/New Zealand*

New Zealand's distinctive indigenous flora and fauna has been shaped and influenced by its isolation over a long period of time. This isolation has contributed to New Zealand having high percentages of endemic indigenous species and highly distinctive ecosystems. For example, two bats, four frogs, sixty reptiles, 90% of all insects and marine molluscs, 80% of vascular plants (ferns, flowering plants and trees) and 25% of all bird species are only found in New Zealand. In contrast, Great Britain has only two endemic species: one plant and one animal<sup>8</sup> (1998:2).

This long period of isolation has meant that New Zealand's plants and animals were very vulnerable to change. Since New Zealand was first settled by humans 1,000 years ago, a high number of indigenous species have been made extinct including a third of all indigenous bird species, 18% of sea birds and a number of plants. Today almost two thirds of New Zealand's land area has been converted into farms, exotic forests and settlements resulting in the destruction and loss of natural ecosystems and species loss. By its own admission, New Zealand has one of the worst records of biodiversity loss. Introduced species and invasive pests collectively pose the greatest threat to remaining natural ecosystems and indigenous flora and fauna.

While New Zealand has a clean, green and healthy environmental image internationally, the reality is that the country's biodiversity has been greatly impacted by human interactions with the environment.

However, New Zealanders are becoming more aware of the importance of preserving and enhancing biodiversity. The traditional knowledge, innovations and practices of New Zealand's indigenous Maori peoples has a key role to play in the future conservation and sustainable use of New Zealand's biological diversity.

Over a period of 1,000 years occupation, Maori have built up a large storehouse of traditional knowledge about the natural world. Like indigenous peoples everywhere, Maori consider themselves to be an intrinsic part of the natural world rather than apart from it. Everything in the Maori world can be explained in terms of whakapapa or genealogy.

Like most other indigenous traditional peoples, Maori have a unique relationship with their natural world. They view themselves as part of and not dominant over their natural flora and fauna. The people, the land, the sea, the forest and all living creatures, are all members of the same family.

In the beginning was Te Kore or total darkness. There was no life, only potential. Papatuanuku, the earth mother and Ranginui, the sky father were locked together in an embrace which stifled all growth. Their children, desperate for light, devised a plan to forcibly separate their parents. This job fell on the shoulders (literally) of one of the children, Tane Mahuta, god of the forests. Binding to his mother below, he pushed upwards with his legs with all his strength and pushed his father apart from the earth.

Into the light created between Papatuanuku and Ranginui sprang the raging winds of Tawhirimatea (god of the winds), the swirling seas of Tangaroa (god of the sea) and all his progeny, the towering forests of Tane Mahuta and all his progeny and the varieties of cultivated and uncultivated crops. Tane Mahuta fashioned the first human, Hine-ahu-one from the clay of his mother. He slept with her and begat a daughter, Hinetitama. With Hinetitama, Tane begat other children. Discovering her father and lover were the same, Hinetitama fled to the underworld, where she lives still in the name of Hine nui ite po. The spiritual home of Maori, the home of their gods and of creation is known as:

Hawaiiki nui  
Hawaiiki roa  
Hawaiiki pamaomao.

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<sup>8</sup> *New Zealand's Biodiversity Strategy: Our Chance to Turn the Tide, A Draft Strategy for Public Consultation* December 1998, p 2.

The Maori name for indigenous peoples is tangata whenua. This literally means “peoples of the land”. The Moriori people of Rekohu (Chatham Islands) claim to have sprung from the earth (no ro whenua ake). Legends tell of different waka or canoes arriving on Rekohu and Aotearoa from Hawaii in various migrations from about 900 AD. They named every landmark, stream, rock, mountain and other natural feature in the landscape, including the flora and fauna they found there. Maori regard themselves as one with their natural world. Maori have a direct whakapapa or genealogical connection to the land through their ancestress Papatuanuku, the earth mother; to the sea and its marine creatures through their ancestor Tangaroa; to the forest and all its inhabitants through their ancestor Tane Mahuta and to the heavens and all of its celestial domain through their ancestral sky father, Ranginui.

During a period of 1,000 years occupation, the ancestors of the Maori developed complex rituals and protocols for regulating behaviour between themselves and the environment they found themselves in. This may best be described as a relationship of reciprocity and respect between themselves and the world that sustained them both physically and spiritually.

Thus, John Patterson (Patterson, 1997:14) describes the Maori environmental philosophy as presenting

“... an image of mutual dependence and harmony, in which all creatures are interrelated, in which the welfare of one is the welfare of all, in which a caring and nurturing relation between humans and other creatures is both imperative and straightforwardly natural....Maori philosophy is a lively philosophy, a philosophy of respect based not on insipid politeness or political correctness but on the mutual dependency of vigorous and robust creatures”<sup>9</sup> (John Patterson, 14).

### ***Cook Islands***

Various non-Governmental Agencies have sought to apply international principles to the Cook Islands.

However, information and feedback from current sources indicate that the Cook Islands lack protection for traditional knowledge in key environmental ecosystems.

Forums that have identified lack of protection include the 2001 Rarotonga National Workshop on Genetic Resources and Benefit Sharing. The Cook Islands Environment Service hosted the event organised by such agencies as the South Pacific Regional Environment Programme (SPREP), the World Wide Fund for Nature-South Pacific Programme (WWF-SPP) and the Foundation for International Environmental Law AND Development (FIELD).

Interestingly, the Discussion Group could not identify any current legislative protections in the Cook Islands for traditional knowledge.

The Group recommended areas of weakness including:

- Documentation;
- Ownership;
- Preservation; and
- Legislation to protect all forms of traditional knowledge<sup>10</sup> (<http://www.gbf.ch>).

### ***Fiji***

<sup>11</sup>Traders and missionaries greatly affected Fijian society (Kerr G J A and Donnelly T A, 1976:19). It is not possible to say that all settlers shared the same attitudes towards the Fijians, but it is true to say that the majority believed themselves far superior to the native people and thought they were carrying out some natural plan in bringing civilization to the Fijian people. The “Great Fiji Rush” which began in

<sup>9</sup> John Patterson, *People of the Land: A Pacific Philosophy*, 14.

<sup>10</sup> <http://www.gbf.ch> - *The Global Diversity Forum – Workshop on Traditional Knowledge, Traditional Resource Management and Biodiversity: Issues, Practices, and Policies*.

<sup>11</sup> Kerr G J A and Donnelly T A, (1976) *Fiji in the Pacific*, p 19.



1859 provided an opportunity to many who had failed to make good on gold fields of Australia and New Zealand or in the towns of the colonies.

<sup>12</sup>The arrival of the European settlers towards the end of the last Century greatly accelerated the loss of biodiversity in Fiji. However, traditional subsistence agriculture still remains predominant in some villages in the interior part of Fiji, which is a result of minimal contact with the western world. This practice, using family labour and a few purchased inputs has the advantage of being generally environmentally friendly but has the disadvantage of low productivity.

<sup>13</sup>Traditional Fijian society is based on communal principles derived from village life. People in the villages share the obligations and rewards of community life and still led by hereditary chief. They work together in the preparation of feasts and in the making of gifts for presentation on various occasions; they fish together, later dividing the catch; and they all help in the communal activities such as the building of homes and maintenance of pathways and the village green. The great advantage of this system is an extended family unit that allows no one to go hungry, uncared for or unloved. Ideally it is an all-encompassing security net that works very effectively not only as a care taking system, but also by giving each person a sense of belonging and identity.

### ***Kiribati***

Kiribati is divided into three main groups of islands<sup>14</sup> (R G Crocombe, 1987:28). The Gilbert Islands (including Banaba) contain about 97 percent of the population. The Phoenix Group has never supported a permanent population and attempts to settle there in the 1930s had to be abandoned in the 1960s because of inadequate water<sup>15</sup> (ibid, 28). The Line Islands are a northern group which was not inhabited at the time of first European contact, but now supports a modest population, and a southern group which has never had sufficient water or soil to support a settled population.

Due to the relatively infertile soil and inhospitable atoll environment the Kiribati people depend heavily on the sea for their sustenance<sup>16</sup> (R Teiwaki, 1988:1). Hence they have a predominantly marine based culture dependent on the sea, lagoon and the eastern reef as sources of food. Sir Arthur Grimble described the traditional Gilbertese culture saying “this is the heart of the matter; the Gilbertese of old were a sea people as no race before or since has been a sea people”<sup>17</sup> (ibid, 1).

The website [www.janeresture.com](http://www.janeresture.com) says that traditional knowledge in relation to the categories below are family treasures and heritage. They consist of skills in fishing, forecasting the weather by observing the clouds, waves winds and birds, navigating by the stars and by the birds and clouds, building canoes, cutting toddy, cultivating a babai plant in a special feeding to enlarge their size, medicine such as special drinks for treating certain diseases or illnesses and massaging and bone-setting and embalming. These skills are kept within the family and can be transmitted to strangers or others outside the family for special favours. Even when this happens not all the skill is revealed. The rest of the skill is imparted at the deathbed to the carer. Sometimes the carer who may not be family may publicly challenge the rightful heirs to claim that he or she gain full knowledge of the skill.

### ***Micronesia***

The Federated States of Micronesia (FSM) is a young independent nation that was under the trusteeship of the United States of America until 1991 whereupon FSM was admitted as a member of the United Nations.

The FSM comprises four States – Yap, Chuuk, Pohnpei and Kosrae. All but Kosrae include more than one island and each has considerable autonomy within the Federation. The total landmass is 702 km

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<sup>12</sup> Ibid, p.19.

<sup>13</sup> Ibid, pp.156-158.

<sup>14</sup> R G Crocombe *Land Tenure in the Atolls* (Suva 1987) p 28.

<sup>15</sup> Ibid, p 28.

<sup>16</sup> R Teiwaki *Management of Marine Resources in Kiribati* (Suva 1988) p 1.

<sup>17</sup> Ibid, p 1.

squared, and the exclusive economic zone is 1.6 million km squared. The FSM comprises 607 islands and has a tropical climate.

Population is majority indigenous Micronesian – and most reside on the main islands of the State capitals. Total population at July 2000 was 107,000. The traditional, social and cultural institutions are still (generally) very strong. Communities are still based on the extended families. These are responsible for the family welfare, especially the customary family land.

Ownership of land and aquatic areas vary between States. In Kosrae and Pohnpei, land is both privately and State owned and aquatic areas are managed by the State as public trusts. Chuuk is mainly privately owned land and aquatic areas – acquired through inheritance, gift or purchase. In Yap, almost all land and aquatic areas are owned or managed by individual estates and usage is subject to traditional control.

In all States, land cannot be sold to non-citizens of the FSM. These ownership patterns greatly influence the strategies and actions required to sustainably manage the biodiversity of the nation.

The economy is small and largely dependent on aid provided through the ‘Compact of Free Association’ with the USA. The majority of the activities are government services including wholesale and retail, subsistence farming and fishing. The government services comprise 42% of the economy, with the commercial tuna fisheries (international and domestic) being the nation’s 2nd highest revenue earner with annual revenues of between USD13-20 million. There were 50,000 tourists enter the FSM in the year 2000<sup>18</sup> (FSM Immigration 2001). Tourism has contributed only a small percentage to the overall economy.

Real GDP per capita is USD2030 in 2001. National Constitution of Micronesia is the basis for all legal authority and decision making for the Nation. The national and institutional framework of the FSM includes both National and State Constitutions with the four States functioning as semi-autonomous governments. It is the prerogative of each State to enact their own legislation in line with their powers as mentioned in the FSM Constitution to address all issues relating to the conservation of biodiversity. At State level there are also municipal ordinances and traditional precedents which are associated with the legislative issues of biodiversity.

Responsibility for environment issues is shared between FSM national and individual State governments. States take the lead role in ensuring that development is avoided in vulnerable areas and ensuring critical natural systems are protected. Each State has made efforts to control development and manage natural resources through creation of land use plans, coastal zone plans, legislation and regulations. The national government provides guidance and technical assistance to States when needed and requests on matters relating to planning, economic development, natural resources, fisheries and environment.

### *Niue*

Traditional biodiversity related knowledge is a recognized aspect of customary Niuean life; with emphasis given to the conservation driven approach of the traditional Niuean culture. However it is recognized by the Niuean Government that, in regards to traditional knowledge, the “youth have less understanding of its true meaning”<sup>19</sup> (<http://www.biodiv.org/world/map.asp?ctr=nu>).

The Niue Government has noted extreme concern about the loss of traditional knowledge in relation to conservation; and cites this factor as a critical “threat to biodiversity” that needs to be addressed.

“The gradual and continual erosion or loss of traditional knowledge of conservation and management is recognised at present as a threat by environmental agencies. This concern is compounded by the low priority granted to the protection and maintenance of such knowledge in some government departments and in school curriculums”<sup>20</sup>.

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<sup>18</sup> Micronesia Immigration 2001 – Kosrae 12%, Pohnpei 37%, Chuuk 36%, Yap 15%.

<sup>19</sup> Niue National Biodiversity Strategy and Action Plan, Government of Niue, 2001, available at <http://www.biodiv.org/world/map.asp?ctr=nu>.

<sup>20</sup> Ibid.

The Niue National Biodiversity Strategy and Action Plan (NNBSAP) lists the following factors as threats to biodiversity:

- Forest clearance;
- Decline in soil fertility and structure
- Non-sustainable land management;
- Lack of sustainable management of marine resources;
- Lack of information and understanding, and increased pressures at community level;
- Loss of traditional knowledge;
- Alien invasive species;
- Over-harvesting of ‘traditional’ species;
- Scarcity of freshwater resources;
- Loss of agricultural biodiversity;
- Lack of legislation or enforcement;
- Fragmented approach from Government and non-Government agencies;
- Population decline;
- Bio-prospecting.

Categories 5, 6, 13 and 14 address directly the use and decline of a traditional knowledge base from which to preserve biodiversity.

Objectives regarding the conservation of forest and agricultural resources suggest that traditional custom (particularly in regards to land management) may actually hinder the retention of biodiversity. Reference to the inclusion of village communities in regards to this plan is limited to the education of legislative requirements, regulations and efforts by the Government to gain ‘buy in’ from villages for the Government operated protection schemes<sup>21</sup> (Action Point 1.5:47).

The Government strategy does, to some extent, envisage that local village communities will play a vital role in reviving and reasserting traditional knowledge. However these initiatives are in the ‘early stages of development’ and no national legislation and corresponding strategies have been implemented by the Government with direct reference to complying with obligations contained in Article 8(j) of the Convention on Biological Diversity<sup>22</sup> (<http://www.biodiv.org/world/map.asp?ctr=nu>).

### ***Palau***

The Republic of Palau is the westernmost archipelago in the Pacific, made up of 586 islands in the North Pacific Ocean, southeast of the Philippines. It has a total area of land mass of 458 sq km, and is slightly more than 2.5 times the size of Washington DC. It has a coastline that stretches 1,519 km, with an exclusive fishing zone of 12 nautical miles. Its territorial sea is 3 nautical miles, and its extended fishing zone is 200 nautical miles. The islands that make up Palau are: Babeldaob, Koror, Peleliu, Angaur, Kayangel, Ngeruangel, the Southwest Islands and the Limestone Rock Islands (over 500).

Palau has a tropical climate, which varies geologically from the high, mountainous main island of Babeldaob to low, coral islands usually fringed by large barrier reefs.

Palau’s natural resources (other than its incredibly rich marine and terrestrial biodiversity) are minerals, marine products and deep water seabed minerals.

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<sup>21</sup> Action Point 1.5; page 47.

<sup>22</sup> Second Annual Report (Niue) on the Convention on Biological Diversity available at <http://www.biodiv.org/world/map.asp?ctr=nu>.

Palau has 21.74% of its land in arable use, with no permanent crops and the rest of the land being used for 'other' purposes.

The environmental issues facing Palau are the inadequate facilities for the disposal of solid waste, poorly-planned development projects which lead to heavy erosion and sedimentation of the inland waters and reefs, threats to the marine ecosystem from sand and coral dredging, illegal fishing practices such as dynamiting the reefs and over-fishing as well as the numerous negative effects resulting from global climate change.

The population of Palau (at July 2002) stands at 19,409 with 68.6% of the population being 15-64 years. The population is growing at 1.61% (July 2002).

The main ethnic group is Palauan (Micronesian with Malayan and Melanesian mix) at 70%, Asian (mainly Filipino, Chinese, Japanese and South East Asian) at 28%, and White at 2%.

The main agricultural products include taro, betel nut, coconuts, bananas, cassava (tapioca), and sweet potatoes.

### *Samoa*

Retention of traditional biodiversity-related knowledge varies among the Samoan people. Some choose to retain knowledge and others prefer to adopt Western values and pursuits.

## **1.2 Plant Genetic Resources for Food and Agriculture**

### *Aotearoa/New Zealand*

The most important agricultural food source to Maori was the kumara<sup>23</sup> (Elsdon Best, 1976:99) (sweet potato). Great ritual surrounded the kumara which was regarded by Maori as the prodigy of Rongo or Rongo-marae-roa, the God of Cultivated Foods. The Maori ancestors introduced kumara and taro together with other native potato species from their homelands in Eastern Polynesia. The early Maori settlers relied principally on fishing, shellfish, berries and birds from the forest and fern root for their subsistence. The early Maori settlers had to adapt from the subtropical climates of island Polynesia to the cooler and harsher climatic conditions of Aotearoa. Over a period of hundreds of years, Maori built up an impressive storehouse of knowledge, tradition and mythology surrounding their food and agricultural products. As one elder from the Tuhoe tribe observed at a UNESCO conference on western science and traditional knowledge:

“There were always three rows of kumara planted. The first row was for the atua (gods), the second row to feed the people and the third row for trade or barter”<sup>24</sup> (Kerehopa, September 2001).

In this way Maori maintained a tangible link between themselves, their creator gods and the gifts bestowed on humankind by the gods.

The importance of the kumara to Maori was highlighted when in 1988, a delegation of Maori elders led by Mrs Hema Nui A Tawhaki Witana (also known as Dell Wihongi), travelled to Japan to bring back to New Zealand a number of native kumara cultivars that were housed in a Japanese research institution. This action in turn led to these elders filing a claim in the Waitangi Tribunal, now famously known as the WAI262 claim by Maori to their rights in relation to the indigenous flora and fauna and cultural and intellectual heritage of Aotearoa. This claim will be discussed in more detail later.

Apart from cultivated tuber crops, Maori relied primarily on plants that they foraged from the extensive forests that once covered New Zealand.

<sup>23</sup> Elsdon Best, *Maori Agriculture: The Cultivated Food Plants of the Natives of New Zealand, With Some Account of Native Methods of Agriculture, It's Ritual and the Origin of Myths*, 1976 Reprinted Version (First Published 1925) 99.

<sup>24</sup> Kerehopa, UNESCO Conference for Pacific Region, Wellington, September 2001 [check reference]

Over millennia of occupation and interaction with the environment, Maori built up an impressive store of knowledge, tradition and mythology concerning plant life and its variable uses for food and other purposes. Over the past 200 years or so, an extensive amount has been written and published about Maori agriculture and plant use for food and medicines.

However, as a result of colonisation and the consequential loss and alienation of their lands and forests, and efforts to assimilate and integrate Maori into Western culture, many of the practices and innovations developed by Maori were stamped out or discontinued. However, much of the underlying knowledge has been retained in various publications and in the minds of many tribal elders who have passed it on to select individuals. There are endeavours by many well meaning people to keep and restore this knowledge but more needs to be done to ensure its long term survival and growth<sup>25</sup> (Robert McGowan). Some of the initiatives to revive and restore this knowledge and cultural practices are discussed in later sections.

The large variety of native hardwood trees including Kauri, Totara and Matai were popular among Maori for the carving of their elaborate meeting houses which today are called marae. Marae perform a vital role as a gathering place for the tribe and for social, political and cultural purposes, particularly the transmission of tribal knowledge.

Native trees were also used extensively for the building of traditional waka or canoes. Before trees were taken for either building of canoes or meetinghouses, the tohunga entered the forest of Tane to recite karakia or prayers of thanksgiving to Tane Mahuta, the God of the Forest. Whenever a tree was felled or a plant was taken, every chip would be removed and either buried or used for some other purpose. Flax plants that were used for the making of clothing, nets, weaving, and a variety of other functions, were highly prized by Maori. Any surplus material and scraps were placed at the base of the plants. These practices demonstrated the great respect that Maori had for their environmental gods and was their way of sustainably managing their resources.

### ***Fiji***

<sup>26</sup>Fiji's natural heritage has been described in three words: rich, unique and ancient (SPACHEE Report, 1998). It is abundantly rich in species. With 1,750 native vascular plants, the islands of Fiji carry a much richer biological cargo than other nearby groups such as Tonga, Samoa, Vanuatu, or the Cook Islands. Fiji also has 57 indigenous bird species, 23 percent of which are endemic. Fiji's forest cover approximately 1,067,310 hectares (both natural and plantation), on 58 percent of the total land mass. Almost all forests are on communally owned native land.

<sup>27</sup>Fiji's vegetation and wildlife are of exceptional scientific and genetic interest due to the high proportion of endemic species (ibid, 2). The floristic diversity of the forest is estimated to be in excess of 300 species per square mile. Fiji's biodiversity is threatened due to a shift from subsistence to a cash-crop development, urbanisation and smallholder farming is currently occurring at about 1 percent per annum.

The threat to Fiji's biodiversity is serious but not yet irreparable. As development accelerates, however, damage may soon be irreparable unless sustainable development is established at grass roots and decision-making levels.

Since the arrival of Europeans in Fiji, the vegetation has changed in several ways. The major impact of the immigrants was the change they made to the existing vegetation. Forest was cleared for commercial use and plantations, and fires destroyed other forested areas. The "talasiga" grasslands, which occur in mostly hilly areas with a marked dry season, are probably the product of repeated fires. Few of the indigenous species are well adapted to either abandoned gardens or talasiga grasslands, but most of the introduced species thrive in this habitats are rarely found in undisturbed forest.

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<sup>25</sup> Robert McGowan [check ref]

<sup>26</sup> SPACHEE Report (1998).

<sup>27</sup> Ibid, p 2.

<sup>28</sup>Plant resources are the basis for survival for most traditional Fijian villages . It is particular important for the people to have access to certain plant genetic resources as it provides them with food, ancient herbal remedies and sustainable agricultural production.

Root crops provide the staple food needs and it is rare for the land to be completely cultivated. Generally a fork or a digging stick is used to clear and build mounds for the ‘tavioka’ or cassava, which is the main crop. Taro or ‘dalo’, yam and ‘kumara’ follow in order of importance. ‘Tavioka’ originally of South American origin, is most favoured because it needs less attention than other crops and will grow on relatively poor land. It requires good drainage and is often grown on steep slopes. It matures in from five to seven months whereas ‘dalo’ takes between six and nine months depending on the variety.

Individual farmers tend to have scattered plots, or ‘teitei’, according to the type of land available and the quality of the soil. The crops which have the highest food value and which take the most from the soil are planted on the newly created areas. The lesser crops follow as the soil becomes less fertile until the time comes, after several seasons, when the land is left fallow to rest.

Bananas and ‘yaqona’ are important cash crops, which prefer moist conditions. The latter is used to make the drink commonly termed ‘kava’ throughout the Pacific, but loosely termed ‘grog’ in Fiji. It is a very profitable crop but is easily damaged by high winds.

<sup>29</sup>Village farming, in common with shifting subsistence cropping in all parts of the world, requires relatively large areas of land to support a few people but it represents an adjustment to poor tropical soils and the limited needs of the people. The traditional methods do not require much capital expense, although the clearing of new areas may require communal effort for which an individual farmer may make customary payments in the form of ‘oco’, food given during the course of work.

Under a system of shifting agriculture the land produces sufficient until such time as the population grows considerably or until a villager needs cash for store goods, clothing, education for his children and other necessities and cash-crop economy producing a surplus of cash crops requires more intensive use of the land.

Plant resources were useful not only for food but also for shelter, medicinal potential, as firewood and for making traditional tools like spear, clubs and tapa cloth.

Food and food quest are central to most of our traditional social and economic activities. No ceremonial function is considered complete without a presentation of food or “magiti”. A function is considered good, apart from other things, if there is more than enough food for everyone attending. It is shameful if people go hungry. People will drift away and the function may end up with only a few people.

<sup>30</sup> Most Fijian foods are eaten cooked by roasting (“tatavu”) on an open fire, or baking in a “lovo” (earth oven) and some can be taken raw. All starchy food like “uvi” (yam), dalo (colocasia esculenta), “tavioka” (cassava) and “uto” (breadfruit) need to be peeled and well cooked before they are eaten (Seroma, L, 2003:1). Some supplementary foods such as “ota” (athyriuna esculentum), “karisi” (water cress) can be eaten either raw or slightly cooked.

### ***Kiribati***

The traditional knowledge of the Gilbertese in relation to plant and food for agriculture is important for ensuring they get as much food from the scarce plant resources available on the islands. The knowledge relates primarily to edible wild plants.

Much of this knowledge is still relevant today and retention of this knowledge is aided by publications on histories and traditions. There is a high reliance placed by families upon native plants for food as opposed to purchased foodstuffs. The preference in taste of the Kiribati people for home grown food resources has ensured that the knowledge relating to these plants has been retained within families.

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<sup>28</sup> Ibid, p 3.

<sup>29</sup> Ibid, p 158.

<sup>30</sup> Seroma, L (2003) Ecotourism: The Fijian Experience, Internet, p 1.

The coconut palm and the pandanus are the most important food-bearing plants on the islands. They mostly grow wild but they are also cultivated. It is assumed that the first settlers of the Kiribati islands found the land overgrown with pandanus trees because the pandanus seed retains its germination potential for a long time even in sea water, whereas the spread of the coconut over vast ocean expanses can only be achieved by human intervention<sup>31</sup> (R Teiwaki, 1988:1). The pandanus was once the main source of food but the coconut palm now assumes that title.

The coconut is the most versatile and valuable plant on Kiribati providing uses which include milk from the green nuts (moimoto) for drinking, (although in the drier southern islands using the nut in this way is considered wasteful)<sup>32</sup> (G Koch, 1986:56-64); the flesh of the mature coconut is used in multitude of ways including eating as it is, grated for use in cooking; it is also valuable for making oil for cooking and lighting. This oil could be refined further and made fragrant for use on the body as protection against the weather or for ceremonial anointing. Coconut timber is used for house building and making weapons. The roots and parts of the young leaves have medicinal uses.

The spathe of the coconut palm is bound and cut and the sap, called sweet toddy or karewe, is collected in a coconut shell<sup>33</sup> (ibid, 56-64). Karewe can, if necessary, substitute breast milk for young children and was commonly used as a drink by people of all ages. The karewe could be boiled to make syrup (kamaimai) which could also be mixed with water for drinking and cooking. In post-European times the art of fermenting karewe to make sour toddy called kaokioki, an intoxicating drink, was learned.

The ripe fruit of the pandanus is used to make kabubu and tuae - both foods for either immediate consumption, or to store for future needs, especially in times of drought and special occasions<sup>34</sup> (ibid, 53-56).

Pandanus leaves were used for making mats for thatch, for making, the kabae, a mat worn by men. Its timber was particularly important in maneaba construction. It also had medicinal qualities and was used for making dyes.

The other important food crops were babai, or swamp taro, which had to be cultivated in pits dug down to the water line and fed with dry compost, soil and chopped leaves contained by a ring woven from pandanus or coconut leaves<sup>35</sup> (ibid, 64-68). The babai took several years to mature. The bero, a tree which produces small fig-like fruit, is also another important food crop.

Considerable time and intensive care is devoted to the cultivation of taro. There are numerous methods of planting and cultivation, which are all carefully-guarded family secrets. Women and children gather leaves from the purslane plant which is a small succulent herb that grows extensively on the islands<sup>36</sup> (ibid, 88-89). This mtea is appreciated by everyone, yet is only prepared and consumed secretly within the family circle due to a fear of being mocked by other families for their lack of coconuts and fish.

Roots such as *Portulaca oleracea* L. Called Boi are also used for food. Everyone gathers the ripe fruits of the *Morinda Citrifolia* L. Called *Non*, which they either eat without preparation or sometimes keep for three days to ripen.

### ***Micronesia***

Terrestrial biodiversity varies from east to west, lowland to highland. The plant genetic resources for food are mainly taro, breadfruit, banana, yam, sugar cane and kava.

Pohnpei agro-forestry consists of over 130 species and studies have identified at least 179 yam, 130 breadfruit and 50 banana cultivars.

<sup>31</sup> R Teiwaki *Management of Marine Resources in Kiribati* (Suva 1988) p 1.

<sup>32</sup> G Koch translated by G Slatter *The Material Culture of Kiribati* (Suva 1986) pp 56-64.

<sup>33</sup> Ibid, pp 56-64.

<sup>34</sup> Ibid, pp 53-56.

<sup>35</sup> Ibid, pp 64-68.

<sup>36</sup> Ibid, pp 88-89.

Yap studies have found 80 yam, 40 breadfruit, 27 banana cultivars interspersed in an integrated system of tree gardens and taro patches.

On Kosrae, many of the freshwater swamps have been converted to agro-forests used for growing taro, bananas and sugar cane.

The FSM is the world centre for breadfruit (*Artocarpus altilis*) and swamp taro (*Cyrtosperma cnamissonis*) diversity.

Major vegetation types are cloud forest, native upland forest, palm forest, agro-forest, secondary vegetation, savannah grass and fern-lands, freshwater marsh, swamp forest, mangroves, atoll forest, limestone forest of rocky coast and beach strand. The area covered by each vegetation type varies between the States and some types may not occur on all the islands.

Cloud forests are restricted to Pohnpei and Kosrae. Upland forest and agro-forest are present in all the States, but the area of relatively intact native forest is very little in Chuuk and Yap.

FSM has over 1239 species of ferns and flowering plants, 782 of which are native, including 145 species of ferns, 267 species of monocots, 370 species of dicots. Each State is represented by a unique diversity.

Kosrae has magnificent swamp forests dominated by endemic *Terminalia Carolinensis* and *Horsfieldie Nunu* trees. Pohnpei has the most endemic species in the FSM; Chuuk is also high in endemics and has the most endangered native forests in the FSM. Yap has the most diverse mangroves and agro-forests in the FSM.

Over 457 species of plants including food plants have been introduced to the FSM. The percentage varies from State to State with records of introduced species comprising about 22% in Kosrae, 40% Pohnpei, 37% in Chuuk and 39% in Yap. Some of these have become invasive pests.

### ***Niue***

“They have a remarkable ability to read biological indicators, such as the flowering of a certain plant which would indicate that a certain type of fish was readily available, and the use of cycles of the moon to time the planting of particular crops” (NNBSAP @ 3).

### ***Palau***

The main elements of the Palauan diet are fish, seafood and taro, cassava, sweet potatoes, kangkum, coconut, and rice and taro. Traditional knowledge is still in use by most Palauans to some extent in the growing of food and crops. Information on TK practices have been documented by the Palau Community Action Agency and the Palau Community College-Cooperative Research and Extension.

### ***Samoa***

The staple foods of Samoa including taro, banana and coconut are still in everyday use in the islands. Much of the traditional knowledge associated with these plant foods has been retained.

Edible plants and fruits do not exist at all in an uncultivated state and are completely absent in a Samoan forest<sup>37</sup> (Kramer, 1995). Exceptions to this include roots of wild yam called *soi*, the *Cordilyne* called *ti*, the *Curcuma* called *ano*, the wild *Spondias* apples called *vivao*, the wild sugar cane called *fiso*, and the *Pandanus* called *fasafasa*, the fruits of the *Eugenia corynocarpa* called *seasea*, of the starch plant *tacca* called *masoa*, and seaweeds<sup>38</sup> (Kramer, 1995).

The need for carbohydrates and vegetables is exclusively met by means of cultivated plants, with the exception that raw fruits are in general not part of a Samoan meal; bananas, pineapples, mangoes, oranges, pawpaws, were introduced by Europeans<sup>39</sup> (Kramer, 1995 :163-167)

<sup>37</sup> Dr A Kramer, translated by Dr T Verhaaren, The Samoa Islands Volume II (Auckland, 1995).

<sup>38</sup> Ibid, p 155.

<sup>39</sup> Ibid, pp 163-167.



Coconut palms and breadfruit trees provide shade as well as food. Banana trees are planted close together behind houses in shady areas where possible. Further away from the back of the house sugar canes are grown while taro is grown in swampy areas where possible.

Primarily five cultivated plants provide Samoans with their staple diet: the coconut palm called *niu*, the banana called (*fa'i*), the breadfruit tree called *ulu*, the taro, called *talo*, and the yam called *ufi*. Cultivated in a modest measure are also sugar cane ('*tolo*'), ti, Pandanus called *fala*, *masoa*, kava called *ava*, paper mulberry called *u'au*, etc, and of late tobacco. Cultivating them is one of the most important occupations for the men, and since they are so important for the Samoan people they entrusted them to the protection of gods and spirits, using *tapui*. *Tapui* is a form of protection whereby anyone who steals or destroys the plantation will be cursed and suffer the consequences whether death or illness. Sacrifices were offered to the god of agriculture *Lesā*, that he might send rain when the dry season began.

Samoan dishes are prepared in dresses called *ofu*. An *ofu* is a parcel of banana leaves in which food is put in them. The inner layer is then covered by a more durable out layer, mostly of *ti* leaves or breadfruit leaves and the whole thing is then tied together at the top. Food is eaten with clean hands and picked up with coconut palm ribs. Kramer has recorded 29 of the most important recipes.

### 1.3 Animals and Micro-Organisms for Food and Other Purposes

#### *Aotearoa/New Zealand*

Traditionally Maori depended heavily on fish, shellfish and birds from the forest as their main source of protein in their diet. In addition Maori brought with them the *kiore* or the Polynesian rat, the *kuri* (native dog), a small chicken and the Polynesian *pig*, to supplement their diet. Due largely to the fact that New Zealand has no natural predators, and its 80 million years of geographic isolation, flightless birds were in plentiful supply. The largest of these flightless birds was the *moa*, which stood over two metres tall. The *moa* became extinct during the period of early Maori settlement along with a number of other flightless birds. Practices of *rahui* developed as a method to prohibit the taking of certain species that were at risk and these prohibitions could last for months extending out to years. The practice of *rahui* is also to be found in other Pacific Island countries including Cook Islands.

Today, the *kuri* is extinct having been replaced by the introduced dog. The *kiore* is found on a small number of offshore islands. Ngati Wai traces their ancestry from the *kiore* and regards the *kiore* as a taonga or treasure of their tribe. This has brought Ngati Wai into conflict with the Department of Conservation who are determined to eradicate *kiore* from Hauturu (Little Barrier Island) because they claim that *kiore* is responsible for threatening other endangered native species that live on Hauturu. Ngati Wai<sup>40</sup> seeks co-management and partnership with the conservation agencies in order to ensure that their traditional knowledge and cultural values are given proper weight in managing and balancing the biodiversity on Hauturu.

The importance of fish and fishing to Maori is highlighted by the tradition of the ancestor and demigod Maui Tikitiki fishing up the North Island of New Zealand (known as Te Ika a Maui) using the magical jawbone of his grandmother. The South Island is known as Te Waka a Maui or the Canoe of Maui. Every tribe had its own well-defined fishing grounds and territories which are often closely held secrets of the local people. The first catch of the season is always gifted back to Tangaroa and respect is shown for the sea by not cleaning fish and shellfish below the high water mark. Elaborate ceremonies and rituals accompanied fishing expeditions and menstruating women were not permitted to gather shellfish. Many if not most of these practices still exist today.

Protection of Maori fisheries and other resources were guaranteed in the Treaty of Waitangi. However, those protections were largely ignored until the mid-1980s when Maori were successful in Court action to achieve recognition of their Treaty rights. A considerable body of traditional knowledge concerning fisheries and marine resources in general, has been built up by Maori. Much of this knowledge is still retained at the local marae level by whanau and hapu. Both commercial and recreational fishing activities

<sup>40</sup> Ngati Wai is one of the six claimants Iwi (tribes) to the WAI262 claim to indigenous flora and fauna.

have had an enormous impact on traditional Maori fishing practices. There is a considerable number of policy and proposed legislative initiatives which impact on Maori fisheries and these are discussed later.

Ngati Kuri has traditionally harvested the native *kuaka* bird for many centuries. The *kuaka* migrates between New Zealand and Siberia stopping at Japan on its long journey north. The *kuaka* is now a protected bird under New Zealand law and it is illegal for Maori to take it for food. However, Ngati Kuri has a long relationship with this bird, which is as equally important as a source of spiritual nourishment as it is for kai or food. An elder of Ngati Kuri once described how when she was very ill, what she craved for most was the taste of the *kuaka* which she claimed was food for her spirit and which she believed would aid her recovery<sup>41</sup>.

Ngati Kuri has long been involved in the struggle to protect the silica sands in Parengarenga Harbour upon which the *kuaka* nest. The silica sands are mined for making glass and computer microchips. The sands are also important for growing the native pingau grass that Ngati Kuri use for weaving tukutuku panels in their meeting houses and for making piupiu (traditional Maori skirts). The relationship that Ngati Kuri has with the *kuaka*, the *pingau* plant, the silica sands and the entire ecosystem of Parengarenga Harbour in Northland is typical of the way traditional Maori relate to their environment. However, their ability to sustainably practice their culture and maintain their traditional knowledge base is inhibited by regulations and laws which have alienated Ngati Kuri from their traditional lands and resources. As was made clear by a number of witnesses for Ngati Kuri in evidence in the Wai 262 case, access to their traditional lands and customary resources is vital if their culture, knowledge and practices are to survive and flourish in the future. Often individuals within the tribe are faced with prosecution by regulatory authorities for continuing to exercise their customary rights and practices.

### ***Fiji***

<sup>42</sup>The Sea has always been a source of food for many Fijians but until recently activity was generally confined to the in-shore areas of the main reefs, and has been subsistent in character (Ravuvu, 1983:34). For thousands of years our ancestors have lived off the ocean whose reefs have been and still are home to a wide range of marine life. <sup>43</sup>The people affinity with the land is, therefore, not merely land-based, but literally extends beyond the shores to encompass the ocean and the reefs that surrounds Fiji (ibid, 1-3). The reef is an essential element that ensures the very survival of the indigenous Fijians. “Kokoda” is a dish of either raw fish or “vasua” (clams), and some varieties of shell fish such as “kaikoso” may simply be marinated for one or two hours in lemon juice and coconut cream before being served. Sometimes raw hot chillies are added to an otherwise plain dish or nibbled raw for flavour.

Water from streams and creeks, rainwater collected in tanks, or well water is drunk with meals and other times. Traditionally water was collected and stored in clay pot containers and bamboo pods of three or four nodes length. For drinking, a well scraped coconut and polished half coconut shell was generally used. Small clay bowls were used where coconut shells were not readily available. For a natural drink during hot weather, the juice of “bu” (green coconut) is refreshing and nutritious. On some small islands water is scarce and coconut milk is used as a substitute.

“Yaqona” (kava) is the best-known traditional drink of the Fijians. It is made of the yaqona plant, and must be prepared in a special way before it can be consumed. It is made sometimes-used green but more commonly it is dried.

### ***Kiribati***

Since the sea is the mainstay of the Kiribati economy, their traditional knowledge relating to the sea and its resources is quite considerable. Loss of some fish species has led to loss of associated knowledge.

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<sup>41</sup> Saana Murray (tribal elder of Ngati Kuri), pers comms.

<sup>42</sup> Ravuvu (1983) p 34.

<sup>43</sup> Ibid, pp 1-3.

Fishing is the second major source of foreign exchange earnings. ([www.janeresture.com](http://www.janeresture.com)); one of the books in the bibliography stated that fish traps and other fishing activities are abandoned as people are pursuing other activities such as education, working abroad, use of money to buy tinned fish.

Kiribati is relatively free from invasive alien plant pests and diseases including invasive species of weeds.

There are a few land crabs which are sought for food<sup>44</sup> (G Koch, 1986:2-3). The Ocypode ceratophthalma (Pallas) called kauki is to be found on the sandy lagoon shore and the eastern side of the islands. These 'ghost crabs' are particularly active at night time and their holes are easily recognisable from the small heaps of sand which they throw up. The islander usually catch the crabs on the eastern beach, to avoid the kauki on the edge of the lagoon that feed on human excrement.

During the day men (and sometimes women) dig at the edges of pools out in the bush for the large Geocaroides crabs called manai, using a planting stick or even a simple husking stick and then dig in the mud with their bare hands<sup>45</sup>. The legs and claws of the captured crab are broken off and thrown into a basket, together with the trunk. Hunting these crabs is more strenuous than collecting the Ocypodes.

While the Polynesians who inhabit the neighbouring islands of Tuvalu are enthusiastic about trapping wild birds and catching them as an important source of meat, the Gilbertese, were not particularly interested in eating them. Catching birds played a minor role in the provision of food.

Most inhabitants of these islands are familiar with the names of 90-100 different kinds of edible fish. The majority of these are caught throughout the year either in the lagoon, on the eastern reef or in the open sea using more than 50 different methods<sup>46</sup>. Each family had its own traditional methods, which were usually regarded as secret, although most of them were generally well-known. Only special methods were effectively kept secret, such as how to catch sharks or use traps to catch moray eels. One must presume that not all methods used in pre-European times have been retained.

### ***Micronesia***

Native terrestrial mammals include 5 endemic species and sub-species of fruit bats of genus Pteropus and a sheath-tailed bat of the genus Emballonura. Studies of these are incomplete.

Introduced species include 3 species of rat, a mouse, deer, pigs, dogs, cats, goats, rabbits and cattle. All of these are devastating on biodiversity. There are 119 species of birds reported in FSM, 31 being resident seabirds, 33 migratory shorebirds, 19 migratory or wetland birds and 5 vagrant species. Each State has one or more endemic species or subspecies, including the Gray White-eye, Pohnpei Lory, Pohnpei Great White-eye, Pohnpei Fly-catcher, Pohnpei Mountain Starling, Caroline Islands Ground-dove (on Pohnpei and Chuuk), Truk Greater White-eye, Oceanic Fly-catcher, Yap Monarch and Yap Greater White-eye. A number of FSM's birds have become extinct or are declining in numbers.

The least understood group of vertebrates in the FSM are the reptiles and amphibians. There is one introduced amphibian, the Bufo-marinus, and over 27 species of reptiles that are mostly native and at least one endemic (Emoia Ponapea).

Several species of lizards have been introduced, but so far no confirmed introductions of the brown tree snake responsible for decimating bird and reptile populations on Guam.

There are numerous species of land snails and 50 species of ants.

The endangered species list is out of date, and has not been updated since the transfer of power from the Trust to the FSM.

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<sup>44</sup> G Koch translated by G Slatter *The Material Culture of Kiribati* (Suva 1986) pp 2-3.

<sup>45</sup> Ibid, pp 2-10.

<sup>46</sup> Ibid, p 10.

**Niue**

Turtles were traditionally collected as food, but this practice is no longer permitted subsequent to the 1996 Domestic Fishing Regulations legislation banning it. This legislation also places ‘allowable daily catch limits’ and size restrictions on the collection of clams and crayfish.

Seaweed has been harvested and eaten in the past, though its collection is more uncommon now.

In relation to the protection of specific species, the NNBSAP looks at placing temporary hunting bans on the collection of ‘peka’ (flying fox) after cyclones. There appears to be a correlation between this restriction and traditional food gathering restrictions used in Niuean custom. The view is to codify this into a regulation; whereby the Government, through its agencies, will enforce penalties. Traditionally it appears that penalties would have been managed through the village governance structure.

**Palau**

Fishing and farming of pigs is the major source of animals for food in Palau. Traditional knowledge in relation to fishing skills and canoe building is in decline as a result of western influences and alternative food sources (Palau Response to Questionnaire: Q11).

**Samoa**

Most of the traditional knowledge in this category relates to fishing practices. Much of this knowledge, including the varieties of fish in Samoa, was recorded by Dr Kramer.

Eating raw seafood is a popular dish in Samoan culture. Very popular fish species are the fat *Platax orbicularis* called *lalafutu* and the *Lethinus reticulatus* called *filoa* attaining a size of up to 2 metres. Some of the most frequently eaten fish are the grey mullet called *anae* and the bonito called *atu*.

In some villages in Samoa it was prohibited to eat some fish and other animals if it was thought that those organisms were the incarnation of an evil spirit associated with a certain place. Such fish included the *a’u* fish and the jumping *anae*. But this only applied to the family or village community that was affected by the particular spirit. It is unclear to what extent this custom is still observed in Samoan villages.

The beginning of the rainy season is considered the most profitable since at that time the fish spawn and move in great numbers at high tide from the open sea into the lagoons. Samoans know that particularly during the palolo time in October and November numerous schools of young fish arrive including the *lo*, the *palai’a*, the *nefu*, the *palagi* and so forth.<sup>47</sup> (Kramer, 1995:473-480). That is when the lagoons are full of fish.

On the other hand, the beginning of the trade wind season is best for bonito fishing, especially when the winds are mild and gentle. When large quantities of fish are caught they are distributed in the village to which the lagoon belongs.

Samoans also look for fish and small sea creatures armed with a stick, running hands into holes in the cliff, poisoning, spearing, or using bow and arrow. The easiest form of fishing, such as gathering invertebrates, is done by women.

Fishing is also conducted in accordance with the phases of the moon. Fisherman often wear sandals plated with coconut fibres called *se’e* as a protection against sharp corals when they travel out on the reefs at low tide. The main source of food from the land animals are pigs and chickens. The native *lupe* pigeon was a particular delicacy in Samoa but today are relatively few in number.

**1.4 Traditional Medicinal Knowledge*****Aotearoa/New Zealand***

Maori traditionally had an extensive knowledge of plants and their medicinal uses. The term “rongoa Maori” refers to traditional Maori medicine, to the practice of traditional Maori medicine and the body of

<sup>47</sup> Dr A Kramer, translated by Dr T Verhaaren, *The Samoa Islands Volume II* (Auckland, 1995), pp 473-480.

knowledge behind that practice<sup>48</sup> (McGowan, 2000). Tohunga or traditional healers had special knowledge of herbal plants and their uses. Many if not most of the practitioners of rongoa were elderly women. As one elderly expert on rongoa Maori explained in her evidence to the Waitangi Tribunal hearing the WAI262 claim in 1997 “I know the plants and they know me”<sup>49</sup>. She knew what time of the year and what time of the day to collect plants from the *ngahere* or forest. She could not just collect from any forest but it had to be the forest that she had a close physical and spiritual relationship with. She described her power to heal as a gift from the Creator and that she was just a conduit between the gods and the plants in order to aid the healing process. She never demanded payment for her services as to do so would diminish the healing powers of the remedies she offered.

Rongoa was used and practiced extensively prior to European colonisation and in the decades immediately following. Pakeha scholars have written extensively about the use and application of rongoa including New Zealand’s earliest botanists and missionaries<sup>50</sup> (McGowan, 2000:15). As the author notes:

“... from the perspective of a contemporary practitioner in traditional Maori medicine, these writings certainly contain much information that is proving of real help in re-establishing rongoa Maori”.

However, McGowan cautions against an over-reliance on the written publications and chemical analysis of the plants as this:

“... does little justice to traditional knowledge and to the culture and traditions out of which that knowledge developed”<sup>51</sup> (McGowan, 19).

McGowan who himself is a practitioner of rongoa Maori and has spent the last 30 years working with Maori traditional healers records that:

“One of the most consistent themes that came through in my working with kaumatua and traditional healers, is that the foundation of rongoa Maori is *taha wairua* “spirituality”; not *wai rakau* “herbal medicine”. The place of *karakia* (prayer) and *tikanga* (rules and protocols) – the appropriate rituals and traditions – is essential. Yet one would not gain that impression from the publications just described. There is an inclination in scientific research to reduce knowledge to terms that one can understand and then claim that that understanding is, in fact, an accurate description of the reality being investigated.

... What is needed is an understanding of the context in which that knowledge found its origins, an appreciation of the values and customs that govern its usage, and an acknowledgement of the priorities that experience has provided. Far from being subjective and therefore unscientific knowledge, such factors provide and enshrine a depth of knowledge that is both valid and important”<sup>52</sup> (McGowan, 20).

New Zealand adversely impacted the practice of rongoa Maori with the passage of the Tohunga Suppression Act 1907. Although not strictly enforced, this had the effect of marginalising the practice of traditional Maori healing and inhibited the retention and transmission of the knowledge<sup>53</sup> (Durie, Mason, 1994:4).

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<sup>48</sup> Robert McGowan, *The Contemporary Use of Rongoa Maori: Traditional Maori Medicine*, Thesis Submitted in Partial Fulfilment for a Degree in Master of Social Science and Anthropology, University of Waikato, February 2000.

<sup>49</sup> Evidence provided by a *kuia* (Maori woman elder), an expert in the practice of rongoa Maori, to the Waitangi Tribunal in support of Ngati Wai traditional evidence regarding the WAI262 claim.

<sup>50</sup> McGowan, p 15.

<sup>51</sup> McGowan, p 19.

<sup>52</sup> McGowan, p 20.

<sup>53</sup> Durie, Mason, 1994, *Whairoa: Maori Health Development*, Auckland: Oxford University Press, p 4.

The reassertion of Maori identity and culture since the mid-1970s has also witnessed a co-related renaissance in the practice of rongoa Maori.

A large body of knowledge of the practice of traditional Maori medicine has been retained, much of it in publications. However, as McGowan notes, the practice of rongoa Maori is quite different from the recording of its physical attributes.

One obstacle to the retention of this knowledge is the loss of traditional healers and finding appropriate people to pass the knowledge on to. Another major issue identified by McGowan is the:

“... separation of the vast majority of Maori from the natural world, of Tane ... as the bush has disappeared or is greatly modified and degraded how is something like rongoa Maori, which depends not just on knowledge of the bush, but having a living connection to it, going to survive?”<sup>54</sup> (McGowan, 126)

As regards the transmission and practice of knowledge, McGowan is of the view that:

“A major effort must be made urgently to plan and establish a system to help the teaching of rongoa Maori, not just the knowledge of rongoa, but the experience of working with the people to whom the medicine belongs, those who need the healing it may provide”<sup>55</sup> (McGowan, 126).

### ***Cook Islands***

The already mentioned Working Report on Genetic Resources and Benefit Sharing noted that medicinal practices had already been published. I have not managed to gain access to this information. The working group argued that traditional medicine in the Cook Islands lacks protection and is already highly commercialised internationally<sup>56</sup>. No examples of the types of medicine were identified.

### ***Fiji***

Many Fijian medicinal plants are common weeds or coastal plants of the type found around villages. The chemicals from plants that are of medicinal values are usually those commonly referred to as secondary metabolites. They are distinct from the natural polymers or primary metabolites such as cellulose, starch, etc., which are present in all flowering plants.

Of greatest medical importance are probably the alkaloids, a diverse class of natural products which contains nitrogen, and which have provided many notable drugs such as morphine, strychnine, quinine, reserpine, etc. Although most alkaloids are poisonous, they can have definite physiological and therapeutic effects when administered in lower concentrations. For example, “boniwai” (scopolamine) is used for stomach ulcers and sea-sickness. The leaves are pounded with those other plants and boiled in water to give a medicine which, when well prepared, is said to be as efficacious as Epsom salts.

<sup>57</sup>Another plant remedy is called “wa yalu” (*epipremnum pinnatum*) (Cambie and Ash, 1994:23). A common epiphytic climbing plant with large leaves that is entire in the juvenile form but deeply dissected in the adult form. The species is widely cultivated as an ornamental plant in the Pacific as well as in other parts of the world. It is reputed to cure rheumatism, kidney trouble, or croup in children is made by boiling a handful of leaves and some of the thin outer bark or integument of the systems in a quart of water and reducing the volume to one pint. The drink is taken frequently. The leaves are also reported to be used to treat ‘rheumatism of the intestines’, stomach disorders and neuralgic headache, and as a decoction in seawater for syphilis. <sup>58</sup>The stems are also used with the leaves of “waro” (unidentified) to relieve muscular spasms and rheumatism (*ibid*, 23). The leaves are cut up, mixed with coconut oil and applied locally to fractured bones. The juice from the crushed leaves is squeezed onto old or new

<sup>54</sup> McGowan, p 126.

<sup>55</sup> McGowan, p 126.

<sup>56</sup> [http://www2.unesco.org/wef/countryreports/cook\\_islands](http://www2.unesco.org/wef/countryreports/cook_islands).

<sup>57</sup> Cambie and Ash (1994) p 23.

<sup>58</sup> *Ibid*, p 23.

wounds, which are then bandaged with the crushed leaves, while a medicine made from the crushed leaves and stems, and that of “yaro” (*premma taitensis*) is used for aches. The decoction of the leaves is also reputed to relieve constipation and other stomach troubles and it is said that during World II, American troops sent many sacks of the plant back to the USA for this purpose.

### ***Kiribati***

What can be ascertained from the literature is that the traditional medical knowledge of the Kiribati people was steeped in customary ritual.

They believed that the length of a person’s life depended on that person’s loyalty to the gods; an early death was a sign of disloyalty.

There was some use of plants for medicinal purposes, but these were usually accompanied by some form of ritual.

A pregnant woman at the time of labour was given medicine to drink, made of roots of special plants which were scraped, left in water, then squeezed<sup>59</sup> (A Talu, M Baraniko, K Tito and others, 1979:15) The solution obtained was given to the woman to drink. Others used leaves of plants in the same way. This medicine would give strength and help promote a swift birth. If the labour was protracted the patient was given repeated doses of the medicine.

If the baby is a boy the umbilical cord was cut by his father or another man with a toddy cutting knife made from shell and at the same time rituals were performed to ensure that the baby would be a brave warrior and a strong man<sup>60</sup> (*ibid*, 15). In the case of a girl, the umbilical cord would be cut by a woman and a magical ritual performed to ensure the baby would be industrious and attractive when grown up.

The knowledge of ritual may become obsolete because of modern medical knowledge, but the knowledge of the plants or other resources for medicinal purposes will be retained if used and the knowledge is preserved. Further research is needed to determine what knowledge is still in use and what has been lost.

### ***Micronesia***

This is in need of further research. There does not appear to be anything available on the internet regarding this topic, and enquiries made have been to date fruitless. Indications from the reports and information already gathered indicate that there is still a reasonably high level of traditional medicinal knowledge, although it is shrinking at an alarming rate. See 1.5 for indications of this.

### ***Niue***

Niue is currently ‘under threat’ by bio-prospectors seeking to exploit traditional and cultural knowledge of medicines for financial gain. The NNBSAP refers to a need for the rights of Niuean people in respect of their indigenous genetic resources to be identified. It calls for a “*national framework that will determine and manage access to genetic resources for commercial purposes as well as a framework that will ensure distribution of benefits*”.

### ***Palau***

Traditional medicinal knowledge is still in use by most Palauns to some degree but assessing the extent of the knowledge and its use will only be possible by undertaking field research and interviewing the people concerned as there is not, as yet, the information available in published form (Holm, Tarita, pers comms).

### ***Samoa***

Dr Kramer recorded 84 different traditional medicines for various ailments<sup>61</sup> (Kramer, 1995:135-142). He also records the names of the various plants that are used in the preparation of remedies. However, due to the impact of Christianity, secrecy surrounding this knowledge, and the passing of people who hold

<sup>59</sup> A Talu, M Baraniko, K Tito and others, *Kiribati, Aspects of History* (Suva 1979), p 15.

<sup>60</sup> *Ibid*, p 15.

<sup>61</sup> Dr A Kramer, translated by Dr T Verhaaren, *The Samoa Islands Volume II* (Auckland, 1995), pp 135-142.

this knowledge, its use is not as prevalent in Samoan society as it once was. Modern medicines have also supplanted traditional remedies in Samoa.

Traditionally illnesses in Samoan culture were attributed to the work of *aitu* or demons<sup>62</sup>. All of nature was considered be alive with the *aitu* and spiritual healers called *taulaitu* were called upon to cure the sick. This was accomplished by a combination of prayer and incantations used in conjunction with traditional herbal remedies.

The influence of Christianity has had a major impact on the practice of traditional healing in Samoan society. The churches now wield the influence in Samoan culture that was once held by the traditional spiritual healers. The provision of food and services that was once accorded to the high chiefs is now predominately offered to the church. Thus, the role of traditional healers is very much diminished, although not entirely redundant, in Samoan culture.

## 1.5 Ecosystem Categories

### *Aotearoa/New Zealand*

As noted above, Maori view the natural world holistically. Thus every river, mountain, lake and forest has its own mauri or central life force. The concepts of mauri and tapu (sacredness) are at the core of the Maori relationship with the natural environment. Thus, when introducing oneself as a visitor to another marae, the speaker will first introduce himself in relation to his mountain, river, canoe and marae within that person's own tribal territory. In this way the person is identifying himself in relation to his home environment.

### *Fiji*

<sup>63</sup>Biodiversity represents the very foundation of the Fijian people's existence (SPACHEE Report, 1998). The forests and coral reefs of Fiji house many plants and organisms with medicinal potential. The tropical forests contain a rich diversity of flowering plants, unique palm species and endemic frogs, lizards, snakes, and birds including many single island endemics. Many species in Fiji are restricted to one or to only a few islands, making them more vulnerable to human disturbance. Fiji is notable for having an endemic family of primitive trees and a biodiversity hotspot for palms.

<sup>64</sup>In Fiji, approximately 68 km sq of moist forest is currently protected in reserves including Mount Tomaniivi Nature Reserve, which is the only reserve containing cloud forest (ibid, 1998). This reserve system protects less than 1% of remaining forests and there is a strong needs for reserves on islands other than Viti Levu and Vanua Levu to protect regional endemics.

### *Palau*

Traditional knowledge to some degree is still in use by most Palauns in relation to the following categories of ecosystems on Palau (Response to Questionnaire: Q10). To ascertain more information to assess the nature and extent of the knowledge and its use and protection would require further field research for reasons given above (see section on traditional knowledge).

Nearly all the Islands in the group sit within a single barrier reef. Tropical forests blanket much of the islands; Mangrove forest and savannah are also present.

The region's underwater biodiversity includes an estimated 1500 species of fish (1300 of which have been taxonomically identified) and approximately 700 species of coral (hermatypic and ahermatypic (or hard and soft)). Giant clams are also present, as are sea turtles, manta rays, grey reef sharks, sea snakes, chamber nautilus, spinner dolphins and dugongs.

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<sup>62</sup> Ibid, pp 131-134.

<sup>63</sup> SPACHEE Report (1998).

<sup>64</sup> Ibid (1998).



Terrestrial ecosystems contain massive reptiles such as the saltwater crocodile, monitor lizards, fruit bats (the only native land mammal), monkeys (crab eating macaques) on Angaur (which were introduced), snakes and smaller lizards. There are no poisonous land reptiles on any of the islands.

Ngerkewid or “Seventy Islands” is the oldest marine reserve in Palau established in 1956 during the U.S. Administration. This reserve is a closed one, prohibiting public access so as to not disturb nesting turtles and seabirds. There are at least 25 other protected areas in Palau.

Babeldaob: old weathered continental or volcanic rock, with some raised coral to the south. Lowland rainforest rich in species, riverine swamp and beach forests, mangroves, scrub, savannah and grasslands, freshwater habitats, fringing reefs, barrier reefs, seagrass beds and lagoons.

Species of conservational interest: Belau Nicobar Pigeon – endangered. Belau Blue-faced parrot finch – rare. Belau white-breasted wood-swallow – rare.

Invasive species – feral pigs, African Snails, Cane Toads and at least 13 different invasive plants including, the vines *Merremia peltata* and *Mikania micrantha*.

Babeldaob is made up of ten States and inhabited by approximately 4,000 people

Beliliou (Peleliu): raised coral. Limestone forest (mostly secondary growth as this island was heavily bombed during WWII) scrub, 2 tidal creeks with mangroves, fringing and barrier reefs and coral reefs.

Coconuts and atoll scrub, with 60m deep lagoon with wide atoll reefs (1200m) and shoreline that is 99% coral reef. Special feature is the Turtle nesting area.

### 1.5.1 Forests

#### *Aotearoa/New Zealand*

As noted above, the god of the forest, Tane Mahuta, separated his father Rangi from his mother Papatuanuku thus letting light into the world. The long and ancient relationship that Maori have with Te Wao Nui a Tane (The World of Tane) has been severely curtailed over the past 200 years by a combination of destruction of forestry ecosystems and replacement with agriculture and pastoral farming and successive policy and legislation that has separated Maori from their traditional lands, including vast areas of native forest. Two thirds of New Zealand’s surviving indigenous forest is now under the ownership and control of the Department of Conservation. Many Maori tribes around the country are seeking to enter into co-management with the Conservation Department in order to re-establish their connection with their lands and are resuming their cultural practices such as gathering of plants for rongoa and taking of birds for special occasions.

#### *Fiji*

<sup>65</sup>Just under half the total land area of Fiji is forested. 44% of the country remains under natural forest cover, concentrated in the wetter parts of the country ([www.fijilive.com](http://www.fijilive.com)). Extensive areas of the drier, mainly western, parts of the two larger islands and many of the smaller ones have suffered severe deforestation. Fiji has embarked on ambitious afforestation and reforestation programmes to reduce the volume harvested from natural forest. To date some 50,000 hectares of land have been brought back into production through afforestation. This means that potential biodiversity conservation areas have increased dramatically. There are 16 forest reserves and 8 nature reserves, proclaimed under the six of the Forestry Decree. They constitute 3.3 percent of the total forest area.

<sup>66</sup>By the end of 1995, the Forest Department had established 48,268 ha of hardwood plantations, mainly (*Swietenia macrophylla*), and 44,978 ha of pine (*Pinus caribaea*) ([www.fijilive.com](http://www.fijilive.com)). About 16,000 ha of extension pines have been established on both communal and private land; these are owned and managed by land-owners own cost.

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<sup>65</sup> [www.fijilive.com](http://www.fijilive.com).

<sup>66</sup> [www.fijilive.com](http://www.fijilive.com).

The Forestry Department's Environmental Forestry Division is undertaking the preservation of representative areas of plant communities for biodiversity.

### Plantations

The “*qele ni teitei*” (gardening land) includes all land areas under cultivation and those in fallow. Much of the land is within easy access of the village, so the people do not have to go far to work and bring back food from their gardens. On the main islands of Viti Levu and Vanua Levu, and other small islands, gardening areas are generally concentrated on river flats and valleys. Usually these gardens are within a radius of five kilometres, most commonly much less. These are areas in great demand by the village people because of their fertility and accessibility. There is also the practice for individuals to retain their gardens sites year after year, and practise shifting cultivation within a particular area so that in time that area becomes closely identified with the particular family or household. In most cases, the boundary for each household is not precisely defined. Restriction and limitation of garden sites and the uneasy feeling that one is being pressed in, makes people want to garden away from each other.

### *Micronesia*

Covered above

### *Niue*

Forest, either mature, secondary, littoral or coastal, makes up 64% of Niue. That is a significant drop from 90% in 1950. Much of the deforestation has occurred for agricultural purposes. A reforestation program has been established using introduced species, and has been operational since 1992. During the South Pacific Biodiversity Program the Huvalu Forest Conservation Area was established.

Policy regarding forests has been formulated into the National Forest Policy, which has been in draft form since 1998<sup>67</sup> (National Forest Policy). Assistance in moving the policy from draft form into practice has been received from New Zealand in the form of the Niue Forestry Project<sup>68</sup> (Landcare Research, 2000).

### *Samoa*

Tall forests, with wildly foaming brooks, high fern trees and their delicately formed fronds cover the decaying undergrowth in which zingiber, balsam-firs, wild bananas, bamboos flourish<sup>69</sup> (Kramer, 1995:427). From the tree giants towering above and overflowing with orchids, ferns and mosses, hang creepers, a “hanging forest” growing vertically. There are no venomous snakes or wild animals.

Further research is needed to assess the extent of which traditional knowledge in relation to forests is retained and protected.

## **1.5.2 Marine and Coastal Ecosystems**

### *Aotearoa/New Zealand*

As an island nation, marine and coastal ecosystems are fundamentally important to the Maori way of life in Aotearoa. Maori today retain an intimate knowledge of their *mahinga mataitai* or local fishing areas. These grounds are well known and jealously guarded. Maori consider that rights and responsibilities over the moana (ocean) are an extension of their rights and obligations over the land and hence the expression *mana whenua mana moana* (authority extending over the land and authority extending over the sea). In this way the terrestrial and marine environments are regarded by Maori as a seamless whole. However, the impact of commercial and recreational fishing, pollution, loss of land through confiscation and increasing commercial/residential development along coastal margins, have all impacted on the ability of Maori to maintain their relationship with their marine and coastal environment and thus perpetuate

<sup>67</sup> DAFF. 1998b. National Forest Policy, Niue (Draft). Volumes 1 & 2. Department of Agriculture, Forestry and Fishery, Alofi, Niue.

<sup>68</sup> Landcare Research, 2000, Niue Forestry Project (Draft), Niue Island. Project Implementation Document. Landcare Research, New Zealand.

<sup>69</sup> Dr A Kramer, translated by Dr T Verhaaren, The Samoa Islands Volume II (Auckland, 1995), p 427.

traditional knowledge related practices. Many hapu and Iwi are opposed to excessive commercial development in the coastal environment in order to protect coastal sand dunes, traditional fishing grounds and places of cultural significance including urupa (burial sites) and other waahi tapu (places of special cultural and heritage importance). Maori consider it is their duty and obligation as kaitiaki (customary guardians) to care for the environment.

As part of a national fishery settlement, customary fisheries regulations have been developed which will enable Maori to establish customary fishing areas in the marine environment known as Mataitai Reserves. These Reserves will prevent commercial and recreational fishing and only allow taking for purposes that sustain the functions of the marae. All taking must be on a sustainable basis and permits are granted by tangata tiaki from the local marae area. Although these regulations have been in place for eight years, there are only two Mataitai Reserves that have been established in New Zealand. A lack of disputes within local tribes and public opposition are delaying the fuller implementation of these customary fishing regulations.

Two Maori tribes, Ngati Konohi from Whangara (the place where the Whale Rider was filmed) and Ngati Kere from Porongahau (both on the East Coast of the North Island), took the initiative to establish marine reserves within their rohe moana (seaward territories) and remain actively involved in the management and review of these reserves<sup>70</sup>. However, generally speaking, most Maori remain sceptical of marine reserves as a marine management tool because of the “no take” policy. These concerns were made clear by Maori in recent submissions to a Parliamentary Select Committee regarding proposed amendments to the marine reserves legislation. In particular Maori raised concerns that the marine reserves were placing a further barrier to the maintenance of their relationship with Tangaroa and potentially conflicted with the customary regulations and other marine management tools, including their own tikanga and kawa (traditional practices and protocols). While Maori support sustainable management of marine resources, they regard locking up the resource as contrary to their traditional practices. In both the case of Ngati Konohi and Ngati Kere, the status of the reserve is to be reviewed in 10 years from the date of establishment.

Maori retain a great deal of traditional knowledge relating to marine and coastal ecosystems. However, the plethora of reforms relating to the marine and coastal environment currently occurring in New Zealand including aquaculture, oceans policy (an initiative intended to provide an overarching and integrated policy approach to oceans management), customary regulations and reforms to marine reserves legislation, are all perceived by Maori as imposing further obstacles to their relationship with Tangaroa and maintenance of customary practices.

Maori have been very vocal and active in voicing their concerns to the Crown. This has resulted in a number of initiatives between Maori and Government agencies to consider how best to recognise and provide for the nature and extent of the Maori interest in the marine environment. These initiatives include the establishment of joint working parties on oceans policy to consider Treaty of Waitangi obligations and to involve Maori more fully in the decision making process at the national, regional and local levels. This initiative is at a very early stage and it remains to be seen how it might be implemented in practice.

### ***Cook Islands***

A recent Nature Conservation Conference in Rarotonga<sup>71</sup> (8-12 July 2002) identified the many features of the Pacific Marine Environment as including: “...the most extensive and diverse reef system in the world, the largest tuna fishery, deepest oceanic trenches and the healthiest remaining populations of many globally threatened species...”<sup>72</sup> (ibid).

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<sup>70</sup> Personal communications with Hone Taumaunu and Piri Sciascia, May 2003.

<sup>71</sup> *Seventh Pacific Islands Conference on Nature Conservation and Protected Areas, Rarotonga, Cook Islands, 8-12 July 2002.*

<sup>72</sup> Ibid.

In terms of marine ecosystems, the Cook Islands' most popular form of traditional knowledge is clearly the re-introduction of ra'ui or marine protected areas on the Rarotongan Coast. This is an initiative of the Koutu Nui, the Cook Islands' formal body of traditional chiefs. Ra'ui is a form of tapu or ban imposed by the chiefs on fishing grounds and species they deem to be threatened. Ra'ui is considered the most appropriate form of reserve, which retains historical links to the way Polynesian people had conserved their resources in the past.

#### How it all started: The Aroko Lagoon

Ra'ui, not exercised for over 50 years, revived out of growing concern among communities and elders, and developed using both traditional knowledge and new scientific information – include two – or three-year bans on fishing in some areas i.e. a Marine Protected Area (MPA) and moratoriums on catching specific species<sup>73</sup>. The ra'ui site extends over the reef to a 340 metre depth contour.

Koutu Nui considered protecting Aroko Lagoon from over-harvesting for several years before requesting that Ministry of Marine Resources complete surveys and subsequent monitoring.

In 1997, a Tourism Master Plan (TMP) project funded a written report on parks, reserves and ra'ui proposals submitted over the last two decades

Koutu Nui discussed the ra'ui proposal in the Aroko-Avana-Nukupure area with their respective village leaders during community meetings between 1997 and 1998. The WWF assisted Koutu Nui to ban harvesting particular resources by funding and co-ordinating a review including all stakeholders and promoting an awareness campaign<sup>74</sup>.

Koutu Nui approached the WWF to help prepare conceptual management plans. Aspects included:

WWF demands that the areas be community-based and managed.

New Zealand Overseas Development Assistance to support lagoon markers and publicity costs, via TMP project funding.

Ra'ui being declared for two years, commencing on 1 February 2 1998, with church services and traditional ceremonies held at the Aroko-Avana-Nukupure lagoon signalling its commencement.

#### Developments

Bi-annual reports to WWF who in turn distributes copies to Koutu Nui.

The Mataiapo and other local land owners appoint honorary wardens to police the ra'ui. All local people are obliged to report any infringement to the wardens.

Once ra'ui ceases, a Mataiapo-selected review committee reviews ra'ui effectiveness, and decide the next steps. MMR reports on state of the stocks will heavily influence any review committee decision.

Recent government surveys found a tremendous rebound in just two years: 31 species of fish – twice as many as before – and 20 times the population.

The WWF gets credit for planting the ra'ui idea. But as Miguel Llanos reports in his article for MSNBC news<sup>75</sup>, the return of ra'ui works only because local elders adopted it, holding regular meetings and bringing in others, including churches and landowners ([www.msnbc.com/news](http://www.msnbc.com/news)).

#### Public Opinion

If the ra'ui is considered successful, one of the major benefits will be the perception by the people that they can manage their resources successfully without the need for Government intervention. A new fishery act is being developed and while not specifically aimed at legalizing ra'ui, it will legally recognise

<sup>73</sup> <http://www.ourplanet.com> - *Tradition Matters*, Cedric Schuster.

<sup>74</sup> <http://www.wwf-pacific.org.fj> - *Cook Islands: Partnership in Conservation and Development*.

<sup>75</sup> [www.msnbc.com/news](http://www.msnbc.com/news) - *Islanders Revive Tradition in Bid to Save Marine Life*, Miguel Llanos, Rarotonga, Cook Islands, September 20, 2002.

management plans. The National Biodiversity plan is currently being developed as a bottom-up process with community consultation as a potential tool for solving other conservation problems<sup>76</sup> (Mackay, Kenneth T, 2).

### Restrictions

There is a total ban on taking or killing all marine life, except for those noted under exceptions.

The area remains open to recreational activities such as swimming, snorkelling, and surfing.

No jet skis or water-skiing permitted.

The following resources are permitted to be harvested while in season:

Patito (sea hare);

Matu rori (mature gonads of sea cucumber);

Ature (mackerel), February – March.

### ***Fiji***

<sup>77</sup>Like the forestland, the “qoliqoli” (fishing ground) used to be and still is to some degree vested in the community (Ravuvu, 1983:75). It includes all rivers, creeks, lakes and stretches of sea, which a particular “vanua” or its component “yavusa” and “mataqali” claimed as their traditional fishing grounds.

<sup>78</sup>Parts of the “qoliqoli” are on occasion put under “tabu” (prohibition) for a time to supply adequate fish for special functions (ibid, 76). Certain rituals relating to birth, marriage and death performed in these various waters impose periodic tabu on fishing on these areas. People who are directly involved in digging the grave and burying the dead can use any section of the qoliqoli for the “vuluvulu” ritual (the washing of hands and legs and the tools used at the burial ceremony. This section is then tabu normally of one hundred nights to provide adequate fish for the “coi”(supplementary food), which will form part of the “magiti” (food gift) for the kinsmen of the dead person. The tabu on the water is normally lifted on the date of the special function. Then the people are allowed to fish for that occasion, and later for their own household use.

<sup>79</sup>In terms of fisheries development and conservation, Fiji is committed to the responsible and rational management of fisheries. Through the customary marine tenure system, traditional methods of conserving fish stocks can be executed, and this form of traditional management is beneficial, resulting in the sustainable and continuing supply of protein to rural people. Fiji supports the principle of responsible fisheries management and conservation, especially also due to the growing fishing pressures and declining fish stocks worldwide.

### ***Kiribati***

Kiribati is sometimes referred to as a “nation of water”. The total area of Kiribati nearly 3,000,000 km square, but the land area is only 719 km square. Kiribati stretches 3,870 km from east to west and 2,050 km from north to south<sup>80</sup> (R G Crocombe, 1987:28). There are 33 atolls and coral islands which make up Kiribati, and these are low and narrow, except Kritimati (or Christmas island) which is the largest atoll in the world, and Banaba (or Ocean island) a now depleted phosphate island which reaches an elevation of about 80 metres.

The Gilbert islands were endowed with limited resources, but the Gilbertese were content and developed ways of making the best possible use of them. There was a limit of the number of people the islands could support, so population control was commonly practised. The sandy coral soil of the atolls contains

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<sup>76</sup> See Mackay, Kenneth T “Community-Based Protected Areas in the Small Island States of the Pacific”, p2.

<sup>77</sup> Ravuvu (1983) p 75.

<sup>78</sup> Ibid, p 76.

<sup>79</sup> [www.fijilive.com](http://www.fijilive.com).

<sup>80</sup> R G Crocombe *Land Tenure in the Atolls* (Suva 1987), p 28.

very limited nutriment for plant growth. Consequently there were very few indigenous plants and those that grew well were used to the full, for food and other purposes as discussed above. The sea was heavily relied on for food.

### *Micronesia*

Species richness and diversity for all inshore marine habitats decrease from west to east. Marine habitats and associated species compositions, due to the small geographical scale of the shallow water marine areas, function on small spatial scales. This provides a wide range of habitats with small geographical location, which directly increases species diversity, but it also increases the potential for loss of diversity if the environment is under threat.

Coral reef ecosystem is the dominant shallow marine feature of the nation. Coral reef biodiversity and complexity is high within the FSM and this diversity diminishes notably from west to east within the region.

Using stony corals as an example, there are approximately 350 species recorded in Yap, 300 in Chuuk, 200 in Pohnpei and 150 in Kosrae.

All the major coral reef types are found in the FSM – barrier, fringing, atolls and submerged reefs. Common reef habitats include lagoon reefs (pinnacle/patch), passes, channels, shallow reef flats, terraces, submerged reefs, slopes, reef holes, embayments, quasi-estuaries, sea-grass beds, mangroves, mud-flats and sand-flats.

Mangrove forests and sea-grass beds are well developed especially along the fringes of the highlands and some atolls and are essential habitats to a very wide range of marine organisms.

The condition of reefs and inshore marine environments are healthy with natural processes controlling the condition and marine biodiversity. However, reef and marine degradation and the loss of biodiversity are attributed to various anthropogenic sources within the urban centres.

The EEZ (exclusive economic zone) is controlled by the national government. Conservation, management and development of all commercial fisheries within the EEZ are mandated to the MFA (Micronesian Fisheries Authority).

The tuna fishery has an annual catch of between 80,000 to 250,000 metric tonnes per annum. It targets the three main species of tuna – skipjack, yellow-fin and big-eye. In addition, other pelagic fish (swordfish, marlin and shark) are also caught as a by-product of this industry.

All waters located within 22.2 kilometres of landfall are under the jurisdiction of respective State governments, wherein all commercial fishing is excluded. These inshore resources are managed, conserved and developed by the respective State governments in association with the resource owners. This includes all coral reefs and associated lagoonal and coastal ecosystems (territorial sea).

The Northern Mariana trench terminates at its greatest depths in Micronesia waters. Information about its biodiversity is almost non-existent.

Oceanographic data is collected throughout the Pacific and resides outside the Micronesia (re ocean floor). There has been no specific study to document the marine biodiversity of the nation to date.

Freshwater species show very high levels of endemism – eg gobies, and this habitat is incompletely studied. This is to be a priority in the future.

The Micronesia has over 1000 species of fish, including at least 12 endemics, several species of marine mammals (dolphins and whales) and 4 species of marine turtles (green, hawksbill, olive-ridley and leatherback). There are over 350 species of stony coral, 60 species of soft coral, 150 species of alga and sea-grasses, and several hundred species of molluscs, echinoderms and crustaceans have been documented.

Information on marine biodiversity is woefully incomplete and urgent assessments are needed here.

### *Niue*

The Niuean Government has established a marine reserve (a protected conservation area) in recognition of the fact that inshore fish stocks had been depleted through lack of regulation. Traditional methods of harvesting fish were not seen as adequate protection.

An objective identified in the NNBSAP for the conservation of biodiversity of inshore coral reefs refers to the integration of ‘appropriate traditional fishing practices with modern management methods as a means of effectively managing stocks’<sup>81</sup> and looks to introduce an education campaign regarding this. A key aspect of this statement is the ‘modern management methods’ that are seen as vital to the utilization of traditional knowledge. It does not appear that the NNBSAP sees traditional knowledge and practices as sufficient to manage biodiversity in their own right, and there are references throughout the document that enforcement needs to occur through ‘modern management methods’ rather than traditional methods. This is reiterated in Action Point 1.4<sup>82</sup> which looks to introduce legislation to protect traditional fishing grounds.

### ***Palau***

Taken from the Govt. Report to the World Summit on Sustainable Development (April 2002) accessible at [www.pacificwssd.org/html/documents/WSSD/Documents](http://www.pacificwssd.org/html/documents/WSSD/Documents).

Barrier reefs:	264.7 km <sup>2</sup>
Lagoons, passes and patch reefs:	1,136 km <sup>2</sup>
Atoll reefs:	65.0 km <sup>2</sup>
Fringing reefs:	195.7 km <sup>2</sup>
Mangrove forests:	45.0 km <sup>2</sup>
Marine lakes:	12 meromictic and approx.
50 holomictic lakes. Coastline:	1,519 km
Soft corals	200
Stony corals	385
Mangrove species	18
Marine fishes	1387 with 11 endemic
Seagrass	9
Macro-invertebrates	>600 with 1 endemic
Turtles	5 with 2 endangered
Saltwater Crocodile	1 (endangered)
Dugong	1 (endangered).

### ***Samoa***

All the islands of the Samoan archipelago have extensive shore reefs, in places (such as east and west of Apia) 1 to 2km wide.

The nature of the Samoan coral reefs are as follows: sandy coastal lateau and at low tide one can see a wide gradually sloping sandy beach of 5 to 10m width and 1.5 to 2 m depth. Beyond it a 1 to 2km wide watery surface extend, bounded seaward by brown walls of debris. The water depth decreases seaward. The bottom of fine sand gradually becomes coarser and is finally composed of pebble-size coral bits.

<sup>81</sup> Theme 3, Objective 1, Action Point 1.3.

<sup>82</sup> Theme 3, Objective 1, Action Point 1.4.

That is the lagoon, called aloalo abounding in fish. A little further seaward one reaches dry ground, first coarse pebbles intermittently water puddles, then a 100 to 200m wide field of debris (fa'atafuna) composed of more or less large resounding coral slabs. Then the water rises 1 to 2 m seaward.

Further research is needed to assess the extent to which traditional knowledge in relation to marine and coastal ecosystems is retained and protected.

### **1.5.3 Island Ecosystems**

#### *Aotearoa/New Zealand*

In addition to the main North and South Islands, there are many smaller islands around the coastline of New Zealand and also offshore. All of these islands fall within the traditional rohe (boundaries) of a Maori tribe. This does not mean they necessarily have ownership of these islands and in most cases they do not. Many of the islands have passed into ownership and management of the Department of Conservation and in some instances are the subject of claims by tribes to the Waitangi tribunal for unfair purchase or outright confiscation. In the case of Kapiti and Mana Islands, Great Barrier Island, Stewart Island and Chatham Island, the local tangata whenua (people of the land) are very much involved in initiatives and measures to protect and preserve indigenous species that are at risk. In some cases such as the Titi (Muttonbird) Islands of the South Island, joint initiatives have been undertaken between Otago University, the local tangata whenua and the Department of Conservation in studying the Titi bird (Sooty Shearwater) which nests annually on the islands and over which Maori continue to exercise a customary annual take<sup>83</sup> (Hendrick Moller).

At the top of the South Island, one local tribe entered into an agreement with the Crown whereby ownership of the native Tuatara (an ancient lizard found only in New Zealand which has survived from the Jurassic period), was temporarily restored to them in recognition of their traditional relationship with the Tuatara. Ownership was then handed back to the Crown but with the agreement as to joint management of the fauna.

Many tribes are seeking restoration of ownership in relation to offshore islands that were often compulsorily acquired for nature reserves by the Crown or by means of an unfair purchase.

#### *Fiji*

Fijians, like most races in the South Pacific, live in very tightly bonded communities where sharing and communality is normal. They exist within a hierarchical system that is dominated by the village and provincial chiefs. Families belong to "mataqalis" (pron.matangalies), vanuas and yavusas, which are ostensibly clans and sub-clans. It is a pretty complicated and inter-woven system. If you meet one person, then all of sudden you are likely to be introduced to a long line of cousins and other related family members.

Typical Fijian homes are without defined boundaries and doors are seldom closed. Most families live within the village complex, though settlements are becoming more common today. In these settlements, families utilise the surrounding village land for home building and their own agricultural purposes. Fijians by law own 80% of the land in Fiji, not directly but through the tribal village system.

A large portion of the indigenous Fijian people are involved with subsistence farming or fishing for a living, though more are turning to the cities to earn money for their families. The majority of them live very simply, without the abundance of material possessions we are accustomed to surrounding ourselves with here in the West. In contrast, the Indian Fijians appear the antithesis of the indigenous people, most choosing to have city-centred professions, accumulate wealth and goods and have barb wire perimeter fences around their houses.

84 During the colonial era in Fiji, the rights of native Fijians were taken into consideration to a greater extent than in many other colonies (Kerr and Donnelly, 1976:19). As migrants from other countries and

<sup>83</sup> Hendrick Moller study on the Titi Islands.

<sup>84</sup> Kerr and Donnelly (1976) p 19.



labourers primarily from India moved into Fiji, a large proportion of the land was reserved for the indigenous Fijians. This land could not be sold or otherwise permanently alienated. As a result of this policy and the continuity of local political structures, indigenous Fijian villages have deep social and ecological grounding. There is a tremendous sense of place. <sup>85</sup>Landowning “mataqali” or family groups continue to manage lands in their territories, and often that control extends as far into the sea as local boats can go (ibid, 156). Government consults with chiefs on fishing licenses and other permits for use of the resources, and outsiders pay leases to the “mataqali” for such uses as hotels, dive areas, plantation and even access roads.

The picture is not totally benign, however, with respect to biodiversity conservation. While the forests and coral reefs of Fiji house many plants and organisms with medicinal potential, there are both internal and external pressures on these resources. Internally, the population grows and intensifies resource use for commercial and subsistence purposes. Land leases and extractive licenses are a source of income for the “mataqali” but lessees do not have incentive to conserve. Waste disposal is a problem. Externally, industries such as logging, and coral harvesting and mining encroach on the land and sea resources.

<sup>86</sup> Conservation groups led by Dr William Aalbersberg from the University of the South Pacific (USP) are continuously seeking ways through funded educational projects to help Fijian communities to husband their biodiversity in the face of these pressures (SPACHEE, 1998). In 1986 workshops were carried out in most Fijian traditional villages. The overall objective of the workshops was to assist villagers to develop the skills needed to plan the sustainable commercial and subsistence use of their natural resources (in particular plants and animals) that are rare, endangered or of particular cultural, economic or ecological importance. The aim was to develop a model that can be adapted for rapid application to many villages.

### ***Kiribati***

In Ancient Gilbertese society before arrival of Europeans, the main social group of Gilbertese society was the kaainga a small group of utu or extended families related through a common ancestor<sup>87</sup> (A Talu, 1979:12). The twenty to a hundred members of each kaainga shared a piece of land on which all member families built their homes called mwenga or tekateka, thus forming a kaainga hamlet. The land of the kaainga usually extended from the ocean side of the atoll to the lagoon side, including the ocean reef called maran and the lagoon reef called nama. In the reef islands, the land of the kaainga extended from one maran to the other right across the island. Access to this area was confined to the kaainga members. Society today remains structured and controlled around traditional ways. Family is still the most important grouping and it is rare to find nuclear families (www.janeresture.com).

Land is of high value and very important. Apart from being the basis of subsistence, it also has social, political and legal significance.

Land everywhere indicated wealth, prestige and social security, but this attitude was particularly marked in the chiefly societies of the central and northern Gilbert Islands. Politically, land was an underlying factor in all levels of warfare prior to the arrival of the British Government. Fighting might be caused by a party wishing to consolidate its landholdings, while the other defended and secured its rights. Despite differences in social and political systems, such conflict was common.

The kaainga was originally the major land-holding group. The land of the kaainga was further distributed among separate families within the kaainga. The same lands were again further sub-divided into lands held collectively by groups of brothers and those held by individuals. This principle was common to all these islands irrespective of their political and social organisation.

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<sup>85</sup> Ibid, p 156.

<sup>86</sup> SPACHEE (1998).

<sup>87</sup> A Talu, M Baraniko, K Tito and others, *Kiribati, Aspects of History* (Suva 1979), p 12.

In exploiting the sea, fishing on the reef, particularly the collection of seafood, was confined to the women, while deep-sea fishing was done by men. Torch fishing on the reef at night was undertaken by both men and women.

### ***Micronesia***

More research required.

### ***Niue***

Misa Kulatea, and family, of Hakupu initiated a project in the Hakupu Heritage and Cultural Park to research and document historically significant areas. Included in this are areas on the island that were traditionally used for burial, fortress and village sites, and caves which used to be used by women as a venue for weaving.

### ***Palau***

Taken from the Govt. Report to the World Summit on Sustainable Development (April 2002) accessible at [www.pacificwssd.org/html/documents/WSSD/Documents](http://www.pacificwssd.org/html/documents/WSSD/Documents)

Also see above (1.5).

- Total islands: 586 of which 12 are continuously inhabited
- Total land area: 535 km<sup>2</sup>
- Highest elevation: Mt. Ngerechelchus, 213.5 metres above sea level
- Land mass below 10 metres: 25%
- Minerals: Phosphate, bauxite, limestone, basalt rock, gold
- Soils: 93% latosols
- Agriculture: approx. 3.7%
- Tropical rainforest cover: 75% (1976)
- Non-forest: 29% (1976)
- Agroforest: 3% (1976)
- Secondary forest: 2% (1976)
- Swamp forest: 6% (1976)
- Plants: 1260, of which 109 are endemic
- Insects: 5000, of which 500 are endemic
- Birds: 141, of which 16 are endemic, 3 introduced and 1 endangered.
- Freshwater fish: 40, of which 3 are endemic
- Terrestrial snails: 300 – all endemic and 1 introduced
- Frogs: 2, of which 1 is endemic and 1 introduced
- Lizards: 30, of which 10 are endemic and 2 introduced
- Snakes: 7, of which 1 is endemic
- Turtles: 1
- Bats: 3, of which 2 are endemic.

### ***Samoa***

The islands of the archipelago of Samoa consist of a series of island ecosystems.

#### 1.5.4 Mountain and Valley Ecosystems

##### *Aotearoa/New Zealand*

Many of the inland tribes such as Tuhoe and Tuwharetoa have a considerable body of traditional knowledge of their mountain and valley ecosystems. Indeed, the first National Park (which now enjoys world heritage status) created in NZ, was the result of a gift from a Tuwharetoa Paramount Chief Te Heu Heu to the nation during the nineteenth century. Much of what has been written about forests and rongoa apply in this category.

##### *Fiji*

<sup>88</sup>Fiji's main islands rise steeply from the seabed (Kerr and Donnelly, 1976:144). With the exception of some of the eastern Lau islands most are 'high islands', formed by volcanic eruptions with associated layers of sedimentary rocks. The others are raised coral limestone lying above, or associated with, their volcanic base.

The relief, or difference in height of the land surface, closely affects landuse. Except where they are cut by large rivers the inland areas are high, with steep slopes and broken and rugged hills. One-third of Fiji is too steep, too rocky or too poor to be used for farming at all.

<sup>89</sup>Fiji has a wide variety of soil types, resulting from major differences in the parent or underlying rock, topography, and climatic influences (ibid, 145). Most of the soils in the mountain areas are low of fertility. Heavy rainfall washes away the soluble soil minerals available for plant growth. In lowland areas fine clay particles are washed to low levels in the soil where they often form a hard pan, which prevents good drainage. Heavy rainfall and high temperatures, which limit the amount of humus, cause the formation of large areas of lateritic soils.

##### *Micronesia*

More research required.

##### *Niue*

No specific reference to mountains and valleys as separate and distinct ecosystems has been made in Niue's official documentation.

##### *Palau*

No mountains, only valleys on Palau.

#### 1.5.5 Inland Waters

##### *Aotearoa/New Zealand*

Practically every Maori tribe in the country identifies very strongly with one or more river or lake both as a source of fresh water fisheries but also for their spiritual sustenance. Claims by Maori to ownership and management of their rivers and lakes have been a source of constant conflict with the Crown over the past 150 years<sup>90</sup> (Geoff Park, 2001:175).

“One outcome of the nearly ceaseless litigation between the Crown and Maori concerning the ownership of inland waterways since the late 19<sup>th</sup> Century, has been the evidence given by Maori of the rules and customs of the various Iwi relating to the ownership and management of rivers and lakes. These accounts

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<sup>88</sup> Kerr and Donnelly (1976) p 144.

<sup>89</sup> Ibid, p 145.

<sup>90</sup> Geoff Park, *Effective Exclusion? An Exploratory Overview of Crown Actions and Maori Responses Concerning the Indigenous Flora and Fauna 1912-1983*, Waitangi Tribunal Publication 2001, p 175.

also manifest a profound economic and metaphysical connection between Maori and the rivers and lakes of the rohe”<sup>91</sup> (Park, 176).

The loss to Maori of their access and rights of their inland waterways and fisheries has been as great as the loss of their lands<sup>92</sup> (Allan Ward, 1997:34). These losses have been as a result of Crown legislation and policy. Such actions and policies are and continue to be the subject of claims by tribes to the Waitangi Tribunal.

As noted elsewhere, in order for traditional knowledge to be retained, practiced and transmitted, it is important that the knowledge holders have access to their natural resource base.

In its findings in the Whanganui River Report, the Waitangi Tribunal found that:

“While the river can be conceived of in terms of its bed, water and fish – as, historically, the Crown has done – there is a prior, customary understanding of the river as a living ecological system”<sup>93</sup> (Park, 178).

“Weighing all the evidence, the Tribunal found the Whanganui River to be, as the claimants te Atihaunui-a-Paparangi had argued since the early 20<sup>th</sup> Century, “a single indivisible entity” and “a living being” ... It found that the Crown, in doing such things as taking river banks for scenery preservation, destroying eel weirs, and regulating navigation upon the river, had been in breach of the Treaty. It considered that the customary understanding of the river as a living being was a vital component of Whanganui rangatiratanga that the Crown, in its past actions, had failed to acknowledge. This was something that had to be remedied in future dealings with Whanganui Iwi concerning the river”<sup>94</sup> (Park, 178-179).

So important is the river ecosystem to the people of the Whanganui River that they consider themselves a part of the river and the river a part of them. Their knowledge of the indigenous flora and fauna of the river system is extensive and has been well documented. Unfortunately, many of the elders with this knowledge have died off but a considerable body of knowledge still remains. The Whanganui people are currently in negotiation with the Crown and are seeking to have ownership of the river restored to them. In this way they can have their ancestral, spiritual and physical relationship with the river fully restored and their tino rangatiratanga more fully recognised.

### ***Micronesia***

See 1.5.2, there has been little or no research or compilation of data regarding inland waterways in Micronesia. The government (national) has identified this as one of their priorities.

### ***Niue***

There are no fresh water wetlands, or inland watercourses, in Niue. There are a small number of fresh water springs and pools that are created by rainfall. There is concern that a lack of fresh water natural resources impacts negatively on the biodiversity of Niue, but this is largely in reference to the expansion of biodiversity rather than protection of the current biodiversity.

### ***Palau***

Taken from the Govt. Report to the World Summit on Sustainable Development (April 2002) accessible at [www.pacificwssd.org/html/documents/WSSD/Documents](http://www.pacificwssd.org/html/documents/WSSD/Documents)

Lake Ngerdorch watershed has the largest perennial stream with drainage of 47 km<sup>2</sup>. Lake Ngardok is the largest freshwater lake in Micronesia encompassing 0.18 km<sup>2</sup> with a storage capacity of 100,000 km<sup>3</sup>. The Ngermeskang River is the second largest river and part of the Ngeremeduu, the largest watershed on the

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<sup>91</sup> Park, p 176.

<sup>92</sup> Allan Ward, *National Overview*, Waitangi Tribunal Rangahaua Whanui Series, 1997, Volume 1, p 34.

<sup>93</sup> Park, p 178.

<sup>94</sup> Park, p 178-179 referring to extracts from the Waitangi Tribunal, Whanganui River Report, 1999, pp 375-376.

west coast of Babeldaob. The Ngirikiil watershed, located in southern Babeldaob is the main source of water for Palau's population, supplying 4 million gallons of water a day.

## **1.6 Knowledge versus Practice**

### ***Aotearoa/New Zealand***

Despite the loss of land and other depredations suffered by Maori, they have retained a large body of traditional biodiversity-related knowledge.

Increasingly matauranga Maori is being given greater credence by mainstream western science. This has resulted from a combination of Maori activism, claims to the Waitangi Tribunal, domestic policy and legislative initiatives and international conventions such as the CBD. Maori are seeking greater participation and opportunities to input at national, regional and local levels involving resource management issues. These initiatives provide Maori with an opportunity to revive maintain and promote their knowledge practices and innovations in relation to their natural world.

The Wai 262 flora and fauna claim is the most significant initiative being pursued by a number of Maori tribes in New Zealand today in order to ensure protection and promotion of their traditional knowledge systems in relation to indigenous flora and fauna. This includes regaining ownership, management and control over indigenous flora and fauna and restoration of their ancestral relationship with taonga.

Discussion follows in later sections on specific initiatives being undertaken to ensure greater opportunity for traditional knowledge to be maintained in a practical sense.

### ***Fiji***

<sup>95</sup>In Fiji's context, the retention of traditional biodiversity-related knowledge is an efficient manner of protecting their social structure, culture and traditions (Ravuvu, 1983:70-71). Protection of biodiversity will promote the cultural aspects of the "vanua" which are related to the physical environment of the Fijian people. To most Fijians, the idea of parting with one's "vanua" or land is tantamount to partings with one's life. As without genetic, organismal and ecological diversity the survival of the Fijian people will be severely threatened.

Practices such as large commercial ventures will have to be minimized because of unsustainable and depleted resources. However the practice of leaving the land to fallow is one of the few practices, which may preserve biodiversity. Deforestation on the other has threatened biodiversity.

### ***Kiribati***

People with the knowledge are practicing it less and not passing it on due to the impact of importing goods and other western "conveniences". Instead of learning how to fish people are focusing on obtaining a western style education or learning other occupations.

Self-sufficiency aided by cash and imported food has meant that people are not as dependent on traditional knowledge as they once were. Several imports have become part of staple diets including: rice, flour, tinned meat and fish<sup>96</sup> (B Bataua, K Iobi, B Kirata, M Kirion and others, 1985:13). As a result babai pits have been abandoned to weeds, and storage huts for coconuts have disappeared. Fruit of the pandanus tree is no longer as popular. Bread, biscuits and rice have replaced tuae and babai. People still fish especially when the price of tinned fish and meat rises, and fresh fish is still preferred.

Some knowledge has become obsolete in areas such as medicine where modern medicine can take the place of traditional medicine.

### ***Micronesia***

Taken from "Special Report: Cultural Dynamism and Change – An Example From the Federated States of Micronesia" accessible at [www.econbot.org/journal/vol55\\_1/ebot-55-01-009.pdf](http://www.econbot.org/journal/vol55_1/ebot-55-01-009.pdf).

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<sup>95</sup> Ravuvu (1983) pp.70-71.

<sup>96</sup> B Bataua, K Iobi, B Kirata, M Kirion and others *Kiribati A Changing Atoll Culture* (Suva 1985) p 13.

The College of Micronesia conducted initial studies on the issue of retention of traditional knowledge amongst its students aged approximately 18 -19 year olds. This was after discussions with individuals from many sectors who thought that many aspects of the Micronesian culture (including music and dance) were being lost at rates that are both significant and tragic. Leaders of the community at government and traditional levels are particularly concerned.

The shift to western based values and practices are directly linked to the over reliance on the Compact of Free Association's aid programme and increased urbanisation causing reliance on the "disposable culture" that the West, and most notably the USA has developed and exported.

The article acknowledges that new and easier ways of doing things have been adopted long before colonisation, however it is the rate of loss of the traditional knowledge that is alarming the elders. Indeed, they believe that due to the lack of knowledge transfer over the last two generations, there are many practices that will be lost completely by the next generation unless an active programme of retention is not put in place to halt the losses.

The college offers a programme in ethno-botanical techniques. During the 1999 course, an informal survey was carried out amongst its students involving a simple show of hands in answer to three questions: how many students remember watching their grandparents making traditional canoes, how many remember seeing their parents making canoes, and how many of the students themselves know how to make a canoe? The striking thing was that for a culture that was once so heavily reliant on ocean-going canoes, none of the young people knew how to make the canoe. This skill was heading towards extinction.

During the 2000 course, the set of questions were formalised into a set of questions regarding several aspects about Micronesian life such as planting taro, use of derris elliptica benth as a fish poison, fermenting breadfruit in pits to secure its reservation throughout the year, the use of marine plants as bait to catch sea turtles for consumption, and the construction of outrigger canoes. The class of 20 were between late teens and early twenties, and came from all the States of Micronesia. The results of this survey show that some of the traditional ways are being preserved, while others are being lost rapidly.

The sharpest decline by far is the case of canoe making and most of the decline is between the older generations of grandparents and parents – indicating that the parents of the students had already turned their sights to a different existence away from tradition. Of the 16 students that had been exposed to the canoe making by their grandparents, not one knew how to make a canoe today.

Of the 5 traditional skills measured, the students were familiar with 4 of them: planting taro (12 of 20), using fish poison (8 of 20), fermenting breadfruit (6 of 20) and using marine plants to catch turtles (1 of 20).

The use of traditional medicines are developed and honed over a life time, whereas these skill studied are picked up and used over a small period of time. The subjects of the study would definitely be considered adults in traditional society who should be conversant with such skills. The downward sloping of the retention of these skills exists because the skills have not been passed on, not because the people of the younger generation have not had the time to learn the skills.

The rate of loss is different with each of the different skills, with the canoe skills being lost at the fastest rate. Perhaps the rate is due to the complexity of the skills – the more complex, the faster the loss. Canoe building involves many stages, therefore the loss is most rapid. With the food cultivation, the ease of buying food is causing the loss in skills there – and over the last generation this loss rivals that of the canoe building.

Language is also being lost, as illustrated by many of the students being unable to remember or know the words for different things in their own tongue.

The studies have their flaws in data gathering – such as the students having been sent from the villages as they are to be the next generational leaders in government, but indications are this trend is applying across the board. The study goes on to discuss a ceremony of canoe racing with each team having to build and race a canoe based on their traditional skills and design. One team was unable to build their own canoe,

so another team had to build one for them in order for them to compete. The race itself yielded great interest, but not one young person was interested in learning the craft of building the canoe.

### *Niue*

Niuean culture still practice traditional conservation methods which are used ‘in conjunction’ with conservation legislation. For example *Fono* is a practice of temporarily restricting activities or closing access to areas. *Tapu* is a longer term, sometimes permanent restrictions are placed on land use; often for spiritual or sacred reasons. The use of these practices is thought to be declining, due to lack of awareness amongst youth, pressure to clear land and harvest resources, and poorly defined boundaries.

### *Palau*

As with the FSM, the current trend is that the people, especially the young people, are moving towards the western style of living, with consumption being the main practice. However, indications are that there is still a very high level of TK retention amongst Palauans. More research is required here though – there is very little in the way of reporting on this issue.

However, even with such high retention, the practice seems to be within the danger areas that TEK is being ignored in favour of western influences and practices. Amongst the Rock Islands there are turtle nesting grounds and also seabird nesting grounds. These are being plundered by poachers for the eggs and live specimens for pets. Fishing is also suffering from dynamiting and over fishing. This is destroying the reefs and deeper habitats of the resources. Giant clams have also been poached, but the national Aquatic Centre has been very successful in pioneering artificial breeding programmes for the giant clam (source – lonely planet, and above sources).

Taken from Lorne Todd Holyoak “Ethnography and Historic Preservation” accessible at <http://crm.cr.nps.gov/archive/24-05/24-05-13.pdf>

The Government has instituted the Historic Preservation Office (HPO) of the republic of Palau to document and preserve the traditional knowledge about both cultural practices and significant archaeological, traditional and historic sites within Palau. It is seen in Palau as important to preserve their tangible and intangible cultural properties within the global community.

This is done by the appointment of historians (male or female) from each State. The objective to appoint someone who is knowledgeable and respected throughout the community. They are drawn from the ranks of the elders of the community and are appointed for life. Every year the historians meet to discuss an aspect of TK. For example, in 2001, they met to discuss and complete a booklet on traditional medicine and therapy. Palauans see this production of materials as important as the younger generation are exposed to the TK and there is a ready source of knowledge in the traditional ways.

Topics such as the mythology of sacred sites, land tenure, cultivation of crops etc. are recorded and widely distributed in order to ensure continuation of their TK.

### *Samoa*

Despite the impact of Western culture and Christianity, there is still a relatively large body of biodiversity-related traditional knowledge still practiced and in use today.

## **1.6 Feasibility of Using Traditional Knowledge to Maintain Customary Practices**

### *Aotearoa/New Zealand*

It is not only feasible but critically important that matauranga Maori is used as the fundamental basis for maintaining and promoting customary practices of tangata whenua. Increasingly matauranga Maori is being regarded as a tool that can assist in commercial development of pharmaceutical products, medicinal products and promotion of commercial products such as clothing, footwear, toys and computer games. Often this is done without the knowledge or prior and formal consent of the knowledge holder. However, there needs to be a greater recognition that Maori knowledge and values has its own inherent/intrinsic worth that needs to be preserved in a Maori context and paradigm. As countless Waitangi Tribunal

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decisions have reported, there have been repeated breaches of the Treaty of Waitangi denying Maori ownership, access and control to natural resources. In order for the knowledge systems to be maintained and transmitted to future generations, it would be necessary to restore the relationship that Maori once enjoyed with these taonga such as forests, rivers and marine areas. The extent to which Maori can use traditional knowledge to maintain their customary practices is dependent on two essential factors. Firstly, the provision of access to natural resources and capacity building to put in place the systems and structures to ensure active participation.

### ***Cook Islands***

#### Ra'ui

The concept of ra'ui perfectly complements the international requirements for environmental protection. Examples include a novel approach to climate prediction using traditional Cook Islands methods of yesteryear. Cook Island Meteorological Service Director Arona Ngari discussed examples of utilising traditional knowledge for climate prediction at the First Regional session of the Global Biodiversity Forum for the Pacific<sup>97</sup> in Rarotonga last year (Arona Ngari, 4-5 July 2002). Arona highlighted the need for more data, monitoring and knowledge necessary to forecast climatic changes. Some of the examples of applying traditional knowledge to climate monitoring and prediction include:

- Unusual blooming of mango season;
- Bending of banana top leaf;
- Porcupine fish on reef;
- Coral bleaching;
- Less lagoon fish in certain seasons;
- Phases of the moon;
- Disruption of flora and fauna.

#### The Karekori – Takitumu Conservation Area

In 1989, the Rarotonga Flycatcher battled against extinction, its numbers reduced to a mere 29. Today, nearly 250 are alive and well in Takitumu Conservation Area on Rarotonga, the largest of the Cook Islands. Three landowning clans – the Kainuku, Karika, and Manavaroa families work together to save the bird, known locally as the karekori. Ian Karika-Wilmott, conservation area support officer commented on the clans' assumptions about conserving the bird; "Most had never heard of biodiversity or ecotourism, and almost all believed that when the Government said conservation, it meant taking away their rights to their land"<sup>98</sup> (<http://www.undp.org.ws>).

Basic land distribution hasn't changed much since the Maori first arrived 1400 years ago. There are six original clans who still honour land divisions established from early times. Despite a long history of disputes and litigation, the three clans have joined forces to save the kakekori.

This fundamental change followed and built on an exciting government program, the Kakerori Recovery Project, which started in 1987. At that time, the Environment Service was happy just to get permission from the clans to do species recovery on the land.

However, as a result, the Government sought active landowner participation from the families. Each clan has a high chief, and extended families gather regularly to discuss issues. Decisions are by consensus, and reaching agreement takes time. After several meetings and discussions in 1996, the families took over project management and formed the conservation area committee for Takitumu.

<sup>97</sup> Climate and Health: Dengue Fever Outbreak Response and Climate Data Management, Arona Ngari, Director of Meteorological Service, First Regional Session of the Global Biodiversity Forum for the Pacific, Rarotonga, Cook Islands 4-5 July 2002.

<sup>98</sup> <http://www.undp.org.ws> - *Warrior People, Warrior People – Three Clans Cooperate and Save a Species in the Cook Islands* at p13.



The most important task is saving the karekori. Staff and volunteers band new birds and conduct a bird census every August. Initiatives have also included a relocation programme to Atrium Island. Following on from that success, Takitumu also provides a nature walk and bird-watching venture which keeps the area financially afloat. By applying traditional decision making to contemporary environmental concerns, Takitumu arouses local interest for conservation without Government intervention. As commented by Anna Tiraa, conservation area support officer, “Now, for the first time, we have enthusiastic and educated people out there working for the environment that is coming up outside of government channels. They are part of a new breed of environmental warriors”<sup>99</sup> (<http://www.wetlands.org/inventory>).

Takitumu Conservation Area’s success has prompted active interest from other Cook Island areas. Residents in both Mangaia and Mitiaro islands have visited Takitumu to learn about how to better protect their endemic species.

### ***Fiji***

It is feasible to use traditional knowledge to maintain customary practices as 60 percent of Fiji’s population live in rural areas with deep social and ecological structure.

The taboo system on marine life and forest resources is also seen as feasible because it promotes biodiversity.

Commercial ventures are not feasible as it largely exploits the natural resources in spite of the natural disasters such as cyclones, tidal waves, flooding and droughts that occasionally affect the island nation.

### ***Kiribati***

It is feasible to use traditional knowledge to maintain customary practices of cultivating taro, coconut, pandanus. The Kiribati people have over the years acquired knowledge of how best to cultivate these on the infertile Kiribati soil.

### ***Micronesia***

Traditional management systems that were undertaken in the past are still in practice throughout much of the nation, although in decline in some communities as seen by the above. The degradation of the nation’s biodiversity has a direct correlation with the erosion and loss of the nation’s cultural heritage, traditional knowledge and traditional conservation initiatives.

The government of Micronesia has identified within the NBSAP the means necessary to prevent further loss of the valuable human and biological resources. They state that all citizens are to ensure those making the decisions must have access to the necessary information to be able to make the correct decisions. The first objective is to preserve traditional knowledge and practices of the cultures of the Micronesia that are important for the protection, conservation, preservation and sustainable use of biodiversity. This is to be done by developing a register to document and preserve all traditional knowledge for the conservation of biodiversity. The Government will develop suitable national and State legislation to protect the knowledge and provide a mechanism for benefit sharing to appropriate knowledge holders. Development of programmes that integrate traditional knowledge etc with modern scientific technology and methodologies to promote conservation and sustainable use of biodiversity will also be undertaken. At this point in time, this has not been achieved by the Micronesia Government, although progress is being made (eg the Micronesian Conservation Trust).

The second objective is empowering resource owners and communities to conserve and sustainably manage biodiversity under suitable customary and modern resource management practices (see page 45 NBSAP for how this is to be achieved).

In the Islands where the ownership of land and marine resources are in private hands and trusts, it is vital that education is given and undertaken to gain the knowledge of the issues and consequences of the individual and combined actions on biodiversity and livelihood.

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<sup>99</sup> <http://www.wetlands.org/inventory> - Cook Islands Tropical Moist Forests: World Wide Fund at p18.

One such process that has been utilised by several NGO's that is having a considerable measure of success is "Community Visioning". The goal of this approach is "shared vision to build a sustainable economy that contributes to social, economic and environmental justice to achieve the quality of life desired by all" (see page 44 of the NBSAP for the outline of exactly how this is achieved).

There have been a number of initiatives to encourage traditional knowledge and agriculture usage to prevent the degradation of the environment. An example of this would be the "grow low" programme of Pohnpei. Here sakau (kava) growers were encouraged to grow lowland sakau and thus spare forest uplands from the native timber milling and stripping of timber for tourist artefact appetites. Instead the income is derived from sakau production, and not dependant on the fickle tourist dollar. However, in achieving this, 2/3 of Pohnpei's rainforest was destroyed to provide the land for cultivation. Pohnpei is also training community conservation officers as well as other initiatives.

The State of Kosrae has developed a Kosrae Island Resource Management Programme with both State and local participation from both young and old in the communities, church leaders and municipal leaders.

Yap has formed an Environmental Stewardship Committee made up from the Council of Chiefs to work with the government and the private sector to develop an integrated programme involving Yap's communities.

However, with all of these initiatives, the rapid migration into urban centres will need to be addressed to prevent further damage to the environment, as well as sustainable wealth generating income from agriculture and traditional practices in order to discourage reliance on aid from the USA, which has been identified as the main cause of loss of knowledge and erosion of the environment.

### *Niue*

The NNBSAP, and other official documentation, does not specifically look to incorporate existing traditional knowledge into biodiversity initiatives. It looks at recognition of these principles as a potential method to assist in bridging the gap between past practices and new legislation. New legislation and regulation(s) are given precedent.

### *Palau*

More research needed, but given the efforts to record TEK, the feasibility would seem to be very high. Tourism would be one of the larger industries in Palau, and ecotourism in line with TEK would be a boom industry. There are tourist guides, such as Lonely Planet, that are already informing the tourist consulting their sites of the customs and ways of the villages and cultures in the area, and giving tips on how to comply.

Fishing and agriculture – has to return to traditional methods if the ecosystems are to remain viable.

### *Samoa*

It is feasible to use traditional knowledge for the maintenance of customary practices relating to collection, cultivation and preparation of foods in particular. These customary practices are efficient and cost-effective and, in the case of some land use practices, help preserve biodiversity in Samoa.

## **1.8 Summary**

### *Aotearoa/New Zealand*

Despite the adverse impacts of colonisation, the loss of lands, dismantling of traditional tribal structures and assimilationist policies, Maori have maintained strong customary links to their natural world. There still remains a significant body of oral and written traditional knowledge base that Maori continue to on as a source of their inspiration and hope for the future. Increasingly, Maori traditional knowledge is being incorporated into mainstream institutions including research and science development, crop and food research and traditional medicines. The key issues for Maori remains one of ensuring they retain control over how their knowledge is used, what it is used for and to ensure that the values (and in particular the spiritual values) of the knowledge base is recognised and protected.

### ***Fiji***

<sup>100</sup>Fiji environment is threatened by high population growth, pollution over exploitation of resources and habitats and there are not recognized marine protected areas (SPACHEE, 1998).

Mangrove forest, coral reef and rainforest are under threat from a variety of combination of factors and many of these are result of human activities.

Lack of environmental control result in estuary system and the adjacent coral reefs to be overwhelmed with salt and toxic industrial waste that escapes into the rivers.

Deforestation for logging, agriculture, industries and other purposes has reduced forest cover and is a threat to majority of endemic birds and animals.

The Fiji government has realized the importance of safe, healthy and resourceful environment. The Environment Department, established in 1993, is now mainly responsible for dealing with issues relating to environment.

The state of retention of traditional biodiversity-related knowledge in Fiji can be found in books written by Ash, J (1987) and Allison, A (1986). These books may be the basis for further research by other interested scholars in the biodiversity preservation in Fiji.

### ***Kiribati***

The tradition of the Kiribati people were largely dictated by the resources available to them to survive. The fishing methods, cultivation of plants, food gathering methods, housing methods were influenced by the availability of resources.

Further the way that they used these resources changes as their knowledge of the environment and its resources and their experience of living in that environment increased. Society was structured the way it was structured because it was the most efficient way of living.

### ***Micronesia***

Significant declines in biodiversity and traditional knowledge are clearly evident within the Micronesia. The rate of decline has increased significantly since the arrival of European explorers, culminating in the highest increases during the twentieth century which is continuing into the new millennium.

This decline is clearly linked to the increase in urbanisation and centralisation of the population, very high population growth rates (> 3%), more effective and efficient technology, commercialisation and increased exportation of natural resources along with reliance on imported commodities and general westernisation of the nation.

The nation is facing a lack of interest from the people and cultures in preserving their traditional knowledge, perhaps due to the perception that the traditional methods and practices are not giving them a better lifestyle whereas the imported and exploitative practices of the West are providing those short-term gains.

Any efforts to prevent further erosion are being hampered by the lack of available data and resources along with advancing technology. There are still so many areas that the Micronesia needs help in the way of knowledge and data resources.

### ***Palau***

Palau is richly blessed with biodiversity, and is still in “good shape” as regards TK but the practices such as poaching, dynamiting and over fishing need to be addressed by government, as does the over-reliance on the Compact of Free Association (aid) with USA.

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<sup>100</sup> SPACHEE (1998).

## 2 IDENTIFICATION AND ASSESSMENT OF MEASURES AND INITIATIVES TO PROTECT, PROMOTE AND FACILITATE THE USE OF TRADITIONAL KNOWLEDGE

### 2.1 Overview: The Wai 262 Claim

#### *Aotearoa/New Zealand (The WAI262 Claim)*

One of the most important and far reaching initiatives being undertaken by Maori in terms of recognition and protection of their traditional knowledge system is the Waitangi Tribunal claim number 262 (abbreviated Wai 262) by six tribal claimants in relation to indigenous flora and fauna *me o ratou taonga katoa* (translated as “and all other treasured things”). The claim is founded upon the protections contained in Article 2 of the Treaty of Waitangi which guaranteed to Maori the “*full, exclusive, and undisturbed possession of their lands, forests, fisheries and all other treasured possessions*”. One of the taonga or treasures that Maori claim should have been protected under New Zealand Law was the Maori knowledge base... This includes its internal structure and mechanisms for transmission, dissemination, tuition, and protection of the knowledge. Maori have asserted in their evidence to the tribunal that these systems (known as wanaanga) existed at the time the Treaty was signed in 1840 but since that time have been eroded and actively dismantled by successive legislative policies and enactments. The Tribunal has heard evidence from six tribes and has travelled all over the North Island and the top of the South Island to hear the evidence. In addition there has been testimony from international witnesses including both indigenous and non-indigenous experts in the field of traditional knowledge and biodiversity<sup>101</sup>.

In essence the basis of mātāuranga Māori is that all things are interrelated and that the basis of knowledge is derived from the natural environment. Fundamental to the Māori world view is that the essence of mauri (life force) and tapu (sacredness) is inseparable from the base of knowledge.

The following are extracts from the statement of claim filed on behalf of claimants for Ngāti Kuri, Te Rarawa and Ngāti Wai:

“6.2. The claimants claim that in its denial of the rights of manaakitanga, kaitiakitanga and te tino rangatiratanga, the Crown has failed to provide for and protect the existing systems of mātāuranga Māori exercised by Ngāti Kuri, Te Rarawa and Ngāti Wai, including but not limited to:

- Specific legislation and policies which prevented the effective exercise by tohunga of mātāuranga Māori;
- The introduction and continued support of an education system which minimised the importance of, failed to actively protect, and denied the exercise and transmission of mātāuranga Māori;
- The introduction and continued support of conservation practices which minimised the importance of, and denied the exercise of mātāuranga Māori;
- The introduction and continued support of health practices which minimised the importance of, and denied the exercise of mātāuranga Māori;
- The support of religious practices which minimised the importance of, and denied the exercise of mātāuranga Māori;
- The introduction and continued maintenance of political and constitutional structures which minimised the importance of, and denied the exercise of mātāuranga Māori;
- The introduction and continued support of systems relating to justice, intellectual property and other portfolios which minimise the importance of, and deny the exercise of mātāuranga Māori;
- The participation in international fora in a manner which minimises the importance of and denies the exercise of mātāuranga Māori”.

<sup>101</sup> Included among these witnesses was the late Dr Posey, whose contribution to the area of protecting traditional knowledge and biodiversity is acknowledged by the author.

The claim was filed in 1991, commenced hearing in 1997 and is still to be completed. Delays in the Tribunal's internal processes and resourcing have affected the timely completion of the claim.

Research reports commissioned by the Tribunal have outlined the Crown's actions in relation to management of indigenous flora and fauna from 1840 up until the present day. One of these reports acknowledges that:

“The failure of the Crown to give legal effect to Maori Treaty rights to flora and fauna can be seen as being a part of its general erosion of Maori authority over New Zealand's indigenous biota ... concomitant with this decline in authority was the major alteration, and in some cases destruction of ecosystems that caused a major decline in the populations of certain species. In some cases this resulted in extinction”<sup>102</sup> (Robyn Hodge, Cathy Marr and Ben White, 25-26).

Parks also notes in his report to the tribunal that:

“An immigrant system of knowledge ('science') entered New Zealand with British settlement and the Crown, and rapidly became the Crown's authority concerning the indigenous flora and fauna. This system of knowledge was largely disinterested in and separate to, the substantial Maori knowledge systems that had developed from centuries of living with the indigenous flora and fauna and being sustained by it. Through this process, historically, biological science became the main determinant of value for the Crown's policies and programmes for valuing and conserving the indigenous flora and fauna. It was at the expense of indigenous Maori knowledge”.

Since the claim was filed in 1991, there have been a range of measures and initiatives that the Government has undertaken in an effort to recognise and promote the use of traditional knowledge relating to the conservation and sustainable use of biological diversity. These include consulting with Maori over a wide range of issues including, development of a biodiversity strategy plans, biotechnology, patents, bio-security strategy, oceans policy, marine reserves, customary fisheries and proposals for allowing the growing of commercially modified crops in New Zealand.

From the perspective of the Wai262 claimants, these initiatives and measures, although a step in the right direction, are regarded as being pre-emptive to the outcome of the Wai 262 claim and the findings and recommendations being sought from the Waitangi Tribunal which seek a broader and more comprehensive approach to the issues than the piecemeal and ad hoc way in which they are currently being addressed.

### ***Cook Islands***

The Cook Islands held the First Pacific Regional Session on the Global Biodiversity Forum (GBF) on July 4-5, 2002. The GBF coincided with the 7<sup>th</sup> Pacific Islands Conference mentioned earlier.

The GBF further implements the Convention on Biological Diversity (CBD) both nationally and internationally.

The Workshop concluded that traditional knowledge and customary land and resource management tenure systems were essential elements for any viable biodiversity conservation strategy in the Pacific Region.

### ***Fiji***

<sup>103</sup>The Convention on Biological Diversity in Fiji was signed in 1992 and ratified in 1993 ([www.fijilive.com](http://www.fijilive.com)). It has a section to ensure the promotion and protection of biological diversity.

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<sup>102</sup> Robyn Hodge, Cathy Marr and Ben White, report to the Waitangi Tribunal on the WAI262 claim, *Summary of Crown Laws, Policies and Actions in Relation to Flora and Fauna, 1840-1912* (document #K5(b), pages 25-26).

<sup>103</sup> [www.fijilive.com](http://www.fijilive.com).

Fiji has just recently secured some funding from GEF, through UNDP, to prepare its Biodiversity Conservation Strategy and Action Plan, and to prepare its national report to the Conference of the Parties.

<sup>104</sup>Besides the preparation of the Biodiversity Strategy and Action Plan as an integrative approach by many organisations, the issue of biological diversity has been incorporated into various structures of responsibilities of various governmental and non-governmental organisations (ibid). It is when formulating national policies or projects that these responsibilities of various are realised and integrated. Examples include the preparation of mangrove management plans and a national land use plan. Fiji also attempts to address issues of the conservation of marine resources, intellectual property rights, bioprospective and bio-safety.

### ***Kiribati***

Traditional knowledge is tied up in and the flora and fauna, and when species are lost due to overexploitation, associated knowledge is also lost. The measures and initiatives are open to the consideration of traditional knowledge, because of the consultation needed for access to cultural land owned by the Kiribati people. Traditional knowledge is also protected, promoted and facilitated in the preservation of biodiversity, because it is revived in the identifying different flora and fauna important to the Kiribati culture and consideration of its use in preserving biodiversity. Legislation and policy of these initiatives and measures also ensure that traditional knowledge is taken into account.

### ***Micronesia***

The Micronesia has identified several areas of traditional knowledge and biodiversity that require action in order to prevent further degradation of the practices and knowledge. However, for whatever reason, there has been little in the way of action by the Micronesia government in solving these problems. Most of the work seems to have been done by NGO's and community leaders and population. However, the biggest challenge is finding the information on what has been done. There is very little available on the internet and in written articles. More time and research is needed in this area to accurately and comprehensively assess this measures and initiatives being undertaken in the Micronesia. Assessment of measures is extremely difficult as there has been such a remarkable lack of documentation of the situation regarding biodiversity and traditional knowledge in the Micronesia.

### ***Palau***

The article by Lorne Todd Holyoak "Ethnography and Historic Preservation" contains much useful information on the activities of the Historic Preservation Office and Division of Cultural Affairs in seeking to ensure that the traditional knowledge of Palau is preserved and available for future generations. The HPO is formed under the Executive, and works closely with the Palauan Dept. of Cultural Affairs which is also concerned with the retention of TK and TEK.

### ***Samoa***

Samoa ratified the Convention on Biological Diversity in December 1993.

## **2.2 Regional and National Land Use Practices**

### ***Aotearoa/New Zealand***

The central Government in New Zealand plays a key role in leading, developing and implementing biodiversity policy and management initiatives while enabling and encouraging local government, the private sector and communities to participate in biodiversity management at the regional and local levels<sup>105</sup> (The New Zealand Biodiversity Strategy, February 2000:89).

The most significant Government initiative in relation to biodiversity and traditional knowledge has been the development of the New Zealand Biodiversity Strategy document in 2000. This draft document

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<sup>104</sup> Ibid.

<sup>105</sup> *The New Zealand Biodiversity Strategy: Our Chance to Turn the Tide*, February 2000, p 89.

acknowledges the Treaty of Waitangi and the relationship between Maori and the Crown. Principle 2 of the Strategy states that:

“The special relationship between the Crown and Maori as reflected in the Treaty of Waitangi should be recognised and provided for in the conservation and sustainable use of biodiversity, including kaitiakitanga, customary use and matauranga Maori”<sup>106</sup> (NZ Biodiversity Strategy, 24).

The strategy identifies a number of key objectives as follows:

“Partnerships and biodiversity management”.

It is fair to say that there is a greater level of awareness and responsiveness to involving Maori in biodiversity management. However, the success stories are still the exception rather than the rule and Maori remain committed to the Crown more fully recognising its role and obligation to give effect to Article 2 obligations.

### ***Cook Islands***

The United Nations Development Programme (UNDP) has lent its support to the Cook Islands by providing an Outer Islands Devolution Programme<sup>107</sup> (<http://www.undp.org.ws/cfprojectcooks>).

UNDP’s main aim is to assist the Cook Islands Government in devolving key resource management and public administrative control to the Island Councils of the Cook Islands.

Specifically, the programme aims to facilitate this process by putting in place the appropriate structures, systems and operations, that have not been revised for island communities and island government operations and which are necessary to enable the Island Councils to effectively govern their own island constituencies.

### ***Fiji***

<sup>108</sup>In terms of land use, village farming is the most important type of agriculture in Fiji (Kerr and Donnelly, 156-157). Fijian villagers use communal land, that is land held by a traditional land-holding unit such as a ‘mataqali’ or ‘I tokatoka’, to which there is no individual title of ownership. There are more than 6,600 recognized land-owning units. Any member of the unit is entitled to use a part of the land but the actual division is decided by local custom. Individual villagers work separate plots of land – the land is not farmed communally. ‘Mataqali’ are being encouraged to divide their land and lease it to individual villagers to farm. This means that one person becomes responsible for a particular unit of land, and becomes a tenant-at-will. He may then acquire a thirty-year lease and become eligible for financial assistance for individual farming projects. If this tenancy is successful the land holding-unit is encouraged to grant a permanent tenancy. Without a permanent lease of this kind there is no real security available if a farmer requires a loan. Villagers still cooperate to perform essential village duties and they combine to produce cash crops, to assist building projects such as new churches, schools and water supplies but this work is no longer obligatory. Farmers may also seek the assistance of other villagers for heavy work, such as forest clearing.

<sup>109</sup>Today nearly one in every four Fijians connected with agriculture is either an independent farmer or a wage-labourer, working on copra estates or other individually run farms (ibid, 159).

<sup>110</sup>Village agriculture varies accordingly to the local conditions imposed by slope, soil, climate, relief and access to urban markets (ibid, 159). In most places, the land cannot support continuous cropping and a form of shifting agriculture is common. A forest area, or an area that has been lying fallow for a period of

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<sup>106</sup> NZ Biodiversity Strategy, p 24.

<sup>107</sup> <http://www.undp.org.ws/cfprojectcooks>.

<sup>108</sup> Kerr and Donnelly, pp 156-157.

<sup>109</sup> Ibid, p.158.

<sup>110</sup> Ibid, p.159.

at least seven years, is cleared and planted. <sup>111</sup>This practice is sometimes called ‘slash and burn’ agriculture but today farmers are discouraged from burning and are liable to be fined if they cleared land in this way (ibid, 158).

### ***Kiribati***

Land is of high value and very important. Apart from being the basis of subsistence, it also has social, political and legal significance.

Land everywhere indicated wealth, prestige and social security, but this attitude was particularly marked in the chiefly societies of the central and northern Gilbert Islands. Politically, land was an underlying factor in all levels of warfare prior to the arrival of the British Government. Fighting might be caused by a party wishing to consolidate its landholdings, while the other defended and secured its rights. Despite differences in social and political systems, such conflict was common.

The kaainga was originally the major land-holding group. The land of the kaainga was further distributed among separate families within the kaainga. The same lands were again further sub-divided into lands held collectively by groups of brothers and those held by individuals. This principle was common to all these islands irrespective of their political and social organisation.

The Gilbertese held various rights to lands, babai pits, fish traps and fishing areas by virtue of their membership in a particular kaainga or utu. A landgrabber would sometime lead his kaainga members to the land he intended to acquire, clear it as if it were his own, and then wait. When the rightful owner showed up, there would be fighting until one party was defeated. The victors would then take or retain the land. But if anyone from either side was killed, the others would have to give the nenebo.

### ***Micronesia***

This report has identified several threats to the biodiversity and traditional knowledge of the Micronesia, including such practices as over-harvesting of fish and wildlife resources, habitat destruction from land clearing, logging, mining, agriculture, uncontrolled disposal of wastes, burning and coastal/near-shore degradation.

Native species of flora and fauna are having to compete and are losing the fight against introduced and invasive species. The expansion of the live reef fish and aquarium fish trades are emptying the waters and upsetting the delicate balance of the reef systems as is the illegal bio-prospecting.

Perhaps the two biggest threats are the lack of technical/financial/trained human resources and the lack of public awareness of the problems the Micronesia is facing.

The report goes on to list some of the degradations of the environment in the Micronesia, including such examples as the conversion of 2/3 of Pohnpei’s rainforest for the commercial cultivation of sakau (kava) in the last 20 years. This loss of native intact forest has led to a plummeting bird and plant population, for example the Micronesian Pigeon has experienced a 75% population decline since 1983.

Another example is the large-scale fishing in the Micronesia. It is estimated that 50-60% of the USD1.7 billion commercial tuna industry is caught in the EEZ of the Pacific Island countries, but these countries realise only 4% of the dollar value of the total catch.

### ***Niue***

Land tenure in Niue is still based largely on customary practices of shared and collective ownership of land<sup>112</sup> (<http://www.biodiv.org/world/map.asp?ctr=nu>). Crown land (or Crown leased land) makes up 5% of land ownership; the other 95% continues to be controlled by customary succession rules. The collective ownership is vested in a magafaoa, a family descent group; and is administered by a trustee

<sup>111</sup> Ibid, p.158.

<sup>112</sup> First Annual Report (Niue) on the Convention on Biological Diversity available at <http://www.biodiv.org/world/map.asp?ctr=nu>.



from within the group, the leveki magafaoa. Land cannot be bought or sold between private citizens, although the Government reserves the right to purchase land for public purposes.

A system of registered land titles has not yet been implemented in Niue.

### ***Palau***

Currently there is mainly subsistence agro-farming. The only ‘cropping’ as such is the coconut, as there are substantial groves of coconut palms throughout the islands.

Taken from the Govt. Report to the World Summit on Sustainable Development (April 2002) accessible at [www.pacificwssd.org/html/documents/WSSD/Documents](http://www.pacificwssd.org/html/documents/WSSD/Documents), the report identifies several initiatives the Government must take in order to maintain sustainable development and enrichment of the environment and its citizens. Of the more notable initiatives already underway, the Government has set up the Office of Environmental Response and Co-ordination, which is mandated to facilitate a co-ordinated approach to Palau’s response measures to environmental degradation, protection and if possible, rehabilitation of natural habitats at the national level.

One of the most pressing needs is proper solid waste disposal, which the Government (according to this report) is working to provide a solution for. However, there is nothing mentioned in the report that would indicate that TEK/TK is one of the avenues to be stressed by these plans. All the solutions seem to be scientifically based. (Note the above initiative by the Executive though).

### ***Samoa***

Traditional Samoan society consists of extended families living in villages. These families and villages have ownership rights over land and adjacent coastal areas. The rules in the villages which govern all families are determined by a council of village chiefs. These rules continue to apply today but are not as restrictive or impinge on use of family lands as much as they once did.

The council of chiefs make rules governing when a family is permitted to harvest coconuts on their land, hunt for pigeons and carry out other activities. In traditional times if such rules were broken the families would be punished using a number of methods.

A common land practice in Samoa which helps to preserve biodiversity, is to only clear such parts of the land that are required for houses and other domestic buildings<sup>113</sup> (Interview with Samoan). The rest of the family plot is left to revert back to its natural state which helps preserve wild plants and animals. This is still a common practice in Samoa particularly where people are in large areas of land.

80% of land in Samoa is held under customary ownership.

## **2.3 Incentive Measures and Capacity Building**

### ***Aotearoa/New Zealand***

Nga Whenua Rahui is a contestable Government fund that was established in 1991 for the purpose of protecting indigenous ecosystems on Maori land that represent the full range of natural diversity originally present in the landscape. The scheme provides incentives for voluntary conservation and enables the Maori owners to retain ownership and control over the land whilst protecting the natural biodiversity by way of a conservation covenant. The covenant is reviewable.

The Nga Whenua Rahui project is one of the more successful terms of achieving conservation of biodiversity and retention of Maori ownership and control over their lands. Since its inception, Nga Whenua Rahui has had 95 proposals approved by the Minister of Conservation involving 112,000 hectares of indigenous ecosystems<sup>114</sup> (<http://www.doc.govt.nz>).

<sup>113</sup> Interview with a Samoan who lived the village life.

<sup>114</sup> Department of Conservation website <http://www.doc.govt.nz> - *Conservation on Private Lands – Nga Whenua Rahui*.

In recent times, the Ministry of Research, Science and Technology (MORST) have sponsoring a number of initiatives involving matauranga Maori. Two such initiatives include a research project investigating the revitalisation and enhancement of aquatic environments through the use of matauranga Maori. A second involves a substantial amount of funding over a three-year period by the Foundation for Research, Science and Technology (administered through MORST) to a Maori biochemist working with a local tribe and tohunga to investigate native medicinal flora. The aim of the project is to document the selection, preparation and medicinal uses of rongoa by the Tuhoe tribe and to identify the bioactive compounds responsible for the medicinal properties observed. The project integrates mainstream science and traditional Maori knowledge with a stated objective of improving socio-economic and health outcomes for Maori<sup>115</sup> (<http://www.morst.govt.nz>).

This project is an example of a Maori tribe working with research institutes and the Government funding agency to investigate from the purely western scientific perspective the medicinal uses of plants used in traditional Maori medicine. However, the critics of this project point out that the research does not take into account the holistic nature of Maori healing practices (most notably the taha wairua or spiritual aspects) but rather focuses on the more narrow chemical processes involved. The project also reflects that each tribe will choose for itself how to exercise its rangatiratanga or tribal authority in the utilisation of its traditional knowledge. In this case, the Tuhoe tribe retains any intellectual property rights arising from the research and a majority share of any revenue generated from commercialisation of the research.

MORST and other Government agencies also offer scholarships as an incentive for Maori academic endeavour in the field of scientific research incorporating matauranga Maori.

It is still early days to assess the effectiveness of these initiatives.

### ***Fiji***

<sup>116</sup>Fiji islands reserves were established by taboos to prevent anyone from entering the area, with express purpose of allowing the wildlife to recover (Ravuvu, 1983:75). Taboos were placed on garden areas as well as on the coral reefs and lagoons. In some instances, particular species were protected. These practices endure in rural areas in some villages in Fiji. Fiji acknowledge the value of community law in their legislation and have recently made progress in forming partnership between communities and national agencies for conservation.

<sup>117</sup>A number of Conservation areas have made progress in developing sustainable benefit-generating activities such as eco-tourism, handicrafts, agro-forestry, alley cropping, whale watching, butterfly ranching, and others ([www.fijilive.com](http://www.fijilive.com)). These types of activities improve the potential sustainability of the projects. However, small eco-tourism operations in Fiji have not yet been economically sustainable and none bring in the level of funding needed for long-term conservation area management.

### ***Kiribati***

All biodiversity related programmes are funded from foreign aid and are externally dependent on limited funding support from national budgetary allocations. Related activities or general measures for conservation and sustainable use are dependent on the availability of external funding.

Financial and other assistance have been received from: the International Plant Genetic Resources Institute for ex-situ conservation of the national coconut genetic resources and the SPC provided funding support for the training and transfer of Bamboo plantlets from Australia to Kiribati.

### ***Micronesia***

Further research required. If Government incentives – none known.

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<sup>115</sup> Ministry of Research, Science and Technology website <http://www.morst.govt.nz>.

<sup>116</sup> Ravuvu (1983) p 75.

<sup>117</sup> [www.fijilive.com](http://www.fijilive.com).

### ***Palau***

There is precious little information available on incentive measures for protection and promotion of TK.

### ***Samoa***

To ensure commitment from customary landowners in relation to environmental and sustainable development initiatives programmes are expected to include incentive measures for the landowners<sup>118</sup> ([www.biodiv.org](http://www.biodiv.org)).

All biodiversity-related projects in Samoa are funded through overseas aid programmes.

## **2.4 Capacity Building Measures**

### ***Kiribati***

The Ministry of Environment and Social Development (MESD) through Environment and Conservation Division is the executing agency at the national level<sup>119</sup> ([www.biodiv.org](http://www.biodiv.org)). The implementation of the National Biodiversity Strategy and Action Plan project has marked a national commitment towards meeting the obligations of Kiribati as a Party to the Convention on Biological Diversity.

Follow-up community consultations are proposed. The result of these consultations will provide updated information and data on the status of biodiversity based both theoretically and practically (e.g. consultations with local people and fieldwork research).

### ***Micronesia***

Responsibility for initiatives in conservation and traditional knowledge retention falls to the individual States under the National and State Constitutions. Each State has a BSAP (Bio-Diversity Action Plan) under the NBSAP. The governmental offices for each State are: Kosrae – The Development Review Commission (DRC), Pohnpei – Department of Land and Natural Resources (DLNR), Chuuk – the Environmental Protection Agency (EPA), Yap – The Department of Resources and Development (DRD), and National level – Micronesian Conservation Trust. Further research is needed with measures in place with these agencies.

There are partnership programmes in place with NGO's in the region, such as those mentioned in 1.6 – eg “community visioning” and so on, but there is not much available data on these.

The College of Micronesia has a programme/course on Ethno-Botany, which is an effective tool for educating the future leaders on preservation of traditional practices as regards botany.

The “Draft Working Report Of The Federated States Of Micronesia National Multi-Stakeholder Consultation” accessible at [www.ncsdnetwork.org/mgf/files/fsm\\_-\\_draft1.pdf](http://www.ncsdnetwork.org/mgf/files/fsm_-_draft1.pdf) has noted the lack of local experts in the area of environmental management and governance. The report calls for more use by the Government of external resources until such time as the Nation is able to provide its own experts in the areas concerned. It calls for efforts to be made in transferring knowledge and appropriate technologies to local institutions, governments and people for the long term benefit of the nation.

The report also notes that external aid assistance from new sources such as the European Union is going without active government initiatives. Continued reliance on only one source – the USA – of aid will hamper development progress and create unnecessary uncertainty of achieving the FSM's objective of self-sufficiency.

The report also calls for the re-structure of the NCSDD (National Committee on Sustainable Development) so as to allow a wider stake-holder representation in its membership (to include traditional

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<sup>118</sup> Division of Environment and Conservation Department of Lands Survey and Environment Apia, Samoa, *Government of Samoa National Report to the Convention on Biological Diversity* (Apia 1988) p 4, at CBD website: [www.biodiv.org](http://www.biodiv.org).

<sup>119</sup> Second National Report to the CBD at Convention on Biological Diversity Web: [www.biodiv.org](http://www.biodiv.org), p 3.

practices/knowledge holders). Priority training is also to be given in such areas as cultural and traditional practices and research.

The report also recommends financing and developing other trusts and funds for the education and development of outlying areas.

#### Repatriation of Objects and Associated Information to Communities of Origin

The “Draft Working Report of the Federated States Of Micronesia National Multi-Stakeholder Consultation” calls for the return of the information gained in the region to the institutions based in the region.

#### ***Palau***

The Ministry of Education is endeavouring to incorporate traditional knowledge into school curriculum development and also through community meetings and consultations to raise awareness of the importance of preserving TK. However, there are no specific programmes or projects (other than the HPO) that are aimed specifically at the protection, promotion and facilitation of the use of TK (Palau Response to Questionnaire: Q15)

Palau’s scarce technical and human resources mean there is a ‘brain drain’ to the USA of the talent in Palau. There is also very little in the way of financial resources to build up the local capacity for retention of TK/TEK.

The Palau government report to the WSSD outlines several initiatives and actions to be taken by the Government, but nothing about TK/TEK. The emphasis appears to be placed heavily on the western science for sustained long-term development.

#### ***Samoa***

Efforts are proceeding to integrate conservation and sustainable use of biodiversity into some of Samoa’s national and planning policies<sup>120</sup> ([www.biodiv.org](http://www.biodiv.org)).

To ensure the effective implementation of the Convention obligations, the Government of Samoa increased the staff of its Biodiversity Conservation Unit from two technical personnel in 1992 to seven in 1998 along with an increase in budget allocation<sup>121</sup>.

Implementing the CBD has involved a wider participation of all stakeholders in national decision-making process with the involvement of NGOs and local communities on all government organised task teams and committee’s.

Samoa developed its draft national biodiversity strategy in 1995 through the New Zealand Overseas Development Assistance (NZDOA) technical assistance programme and in association with the development of the National Biodiversity Policy under the National Environment Management and Development Strategy (NEMS). The draft was revised and improved as part of National Biodiversity Strategy and Action Plan (NBSAP) funded project<sup>122</sup>.

## **2.5 Legislative Measures**

### ***Aotearoa/New Zealand***

Various environmental legislation and resource management legislation requires that account be had to Maori cultural and spiritual values and regard be had to the principles of the Treaty of Waitangi when making decisions. For example section 4 of the Conservation Act 1987 states that “effect be given to the principles” of the Treaty and section 8 of the Resource Management Act 1991 that the principles be

<sup>120</sup> Division of Environment and Conservation Department of Lands Survey and Environment Apia, Samoa, *Government of Samoa National Report to the Convention on Biological Diversity* (Apia 1988) p 4, at CBD website: [www.biodiv.org](http://www.biodiv.org).

<sup>121</sup> Ibid.

<sup>122</sup> Ibid, p 10.

“taken into account”. “particular regard “be had to kaitiakitanga” (Maori concepts of environmental guardianship) and in section 6(e):

“In achieving the purposes of this Act, all persons exercising functions and powers under it, in relation to the use, development, and protection of natural and physical resources shall recognise and provide for the following matters of national importance ... the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga”.

Policy makers, local authorities (district and regional elected bodies responsible for administering the Act) and decision makers are to demonstrate how these matters have been taken into account in writing their policy statements and plans and granting resource consents. They are also obliged to take into account Iwi resource management plans and ability of local authorities to transfer certain powers to Iwi Authorities (section 33). Despite the Act being liberally sprinkled with provisions empathetic to Maori and Treaty issues, there remains, after 12 years of experience with the Act, a high level of dissatisfaction and frustration among Maori with the ineffectiveness of the legislation to recognise and protect their interests. This is the combined result of a lack of resources among Iwi when up against developers with ‘deep pockets’, lack of representation on decision making bodies, heavy workloads and lack of will on the part of many local authorities and the narrow interpretation by the courts of the legislation. The RMA was described by the Waitangi Tribunal in 1993 as being “fatally flawed” because the provisions were considered too weak and easily read down or marginalised. For most Maori this has been the experience under the Act.

However, a recent decision of the High Court in NZ on an appeal under the RMA recognised for the first time the importance and admissibility of traditional oral history in a case involving Maori objections to a highway being constructed through lands containing burial sites and other cultural values.<sup>123</sup>

Proposed Amendments to the RMA.

Historic Places Trust Act ----recent High Court decision to admit oral traditional evidence of ancient burial grounds and sacred sites in opposing plans to built a motorway extension over ancestral lands.

Hazardous Substances and New Organisms Act----Take account of the Treaty but spiritual concerns of Maori for the environment did not stop environmental Management Authority (ERMA) granting consent to implant human genes into cows by giving greater weight to scientific as opposed to cultural evidence.

Fisheries Act.

Treaty of Waitangi (Fisheries Claims) Settlement Act 1992----Maori customary fisheries.

New proposals for Oceans Policy/Marine reserves and aquaculture law reforms.

### ***Cook Islands***

The Cook Islands Constitution provides for the establishment of the House of *Ariki* (Chiefs) comprising Ariki representing both the Outer Islands and Rarotonga. The function of the House is to consider matters relating to the welfare of the people of the Cook Islands as may be submitted to it by Parliament and to express its opinion and to make recommendations thereon including any question affecting the customs and traditional practices of the Cook Islands.

The traditional body *Koutu Nui* was established to provide *mataiapo* and *Rangatira* (sub chiefs) of each of the tribes an opportunity to take part in the decision making process of Government<sup>124</sup> (<http://unfccc.int/program/sd/technology/teasia.html>).

By enshrining the right of the Ariki in its constitution, the Cook Islands recognise the significant role of customary law and practice. It goes a long way to avoiding potential conflicts between national law and customary law.

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<sup>123</sup> Leo Watsons case

<sup>124</sup> <http://unfccc.int/program/sd/technology/teasia.html> - Cook Islands Country Paper “*Transfer of Technology Consultative Process*”, Asia and the Pacific Regional Workshop, 17-19 January 2000, Philippines.

The Cook Islands seek to take biodiversity issues seriously through such initiatives such as the Environment Service (ES) established by the Rarotonga Environment Act 1994-95.

The ES implements the National Environment Management Strategies (NEMS) that identifies environmental awareness and education improvement as a major goal and recommends the strategies of preserving traditional knowledge management systems. ES awareness and education programs include:

- Environmental Awareness Training;
- Environmental Youth Program;
- Environmental Education in School Curricula.

The Natural Heritage Project (formerly part of the ES but now a separate entity) specialises in collecting and communicating information on the biological diversity of the Cook Islands. The Service has found past community environmental workshops ineffective. The Service has had more success by “*piggy-backing*” onto programmes and workshops initiated by non-government organisations. These include Koutu Nui, House of Ariki, the National Council of Women, Youth Groups, Uniformed Organisations and environmental NGOs such as Taporoporoanga Ipukarea Society and the Rarotonga Environment Awareness Program<sup>125</sup> (<http://www.undp.org.ws/cfprojectcooks>).

As well as cooperating with NGOs to educate and promote awareness of local environmental issues the Environment Service also cooperates with international agencies such as SPREP, UNESCO and WWF to promote regional themes and global initiatives<sup>126</sup> (ibid).

The ES promotes environmental issues through the media. It intends to expand its services to the outer islands and to target local issues such as traditional knowledge.

### ***Fiji***

<sup>127</sup>The Fiji Ministry of Agriculture, Fisheries, and Forests are committed to promoting sustainable biodiversity ([www.fijilive.com](http://www.fijilive.com)). Fiji has also a comprehensive “Marine and Land Conservation Improvement Act” which covers good husbandry of land and marine resources. Failure to adhere to the Act can lead to prosecution by the local authority.

<sup>128</sup>The Fiji government has continued to promote sustainable forest management both through domestic policy development and at international level (ibid). Fiji is committed to the effective implementation of the outcome of UNCED, having signed and ratified the International Convention on Biological Diversity and the UN Framework Convention. Major initiatives taken towards sustainable diversity include:

Fiji Forest Sector Review and its incorporation into the National Action Plan;

Re-inventory of the indigenous forest, installation of the Geographic Information System;

Fiji Logging Code of Practice

<sup>129</sup>In terms of fisheries development and conservation, Fiji is committed to the responsible and rational management of fisheries (ibid). Fiji signed and ratified the Wellington Convention on 11 August 1993 and 18 January 1994, respectively. This convention prohibits the use of long driftnets in the South Pacific.

<sup>130</sup>Current fishing policies regarding conservation and exploitation of fish stocks are enshrined in the Fisheries Act Cap 158, the Marine Species Act 158A and subsidiary legislation (ibid). The Fisheries Act addresses fishing within traditional customary fishing rights area is no commercial fishing activities would be undertaken in traditional fishing areas unless the consent of the chiefs and the people having the right to fish in these areas obtained.

<sup>125</sup> <http://www.undp.org.ws/cfprojectcooks>.

<sup>126</sup> Ibid.

<sup>127</sup> [www.fijilive.com](http://www.fijilive.com).

<sup>128</sup> Ibid.

<sup>129</sup> Ibid.

<sup>130</sup> Ibid.

### *Micronesia*

As identified in the questionnaire posted at [www.biodiv.org](http://www.biodiv.org) there has been no legislative measures undertaken by the FSM for the protection of the traditional knowledge and practices. However, there is work being done in the Pacific towards the adoption of a model law for the Protection of Traditional Ecological Knowledge, Innovations and Practices.

### *Niue*

A key part of the Niue National Biodiversity Strategy and Action Plan is to educate its population about environmental conservation.

Reforestation projects, the establishment of the Huvalu Forest Conservation Area and the creation of the Anono Marine Reserve are key advances in planning for sustainable use of biological diversity. In addition to this the Niuean Government seems committed to researching and recording flora and fauna species so that analysis can be undertaken. A thorough collection of Niue's flora was completed in 1970, and additions have been made to this over time. The South Pacific Commission has also conducted a survey on insect species, and will report to the Niue Department of Agriculture, Forestry and Fisheries soon.

The area of Huvalu Forest Conservation Area comprises almost 20% of the total surface area of Niue, and as such represents a substantial commitment to the protection of existing biodiversity. However similar project developments are hindered by Niue's inability to independently fund research and conduct technical studies. It is dependent on funding from UNDP and other agencies to advance these areas further<sup>131</sup> (<http://www.biodiv.org/world/map.asp?ctr=nu>).

Niue acceded to and subsequently ratified the Convention of Biological Diversity (CBD), the United Nations Framework to Climate Change Convention (UNFCCC) and the United Nations Convention to Combat Desertification (UNCCD).

Niue is also strongly committed regionally to the South Pacific Regional Environment Programme, the United Nations Development Programme, the South Pacific Applied Geoscience Commission and the South Pacific Commission.

“Further evidence of Niue's commitment to sustain and effectively manage its environment is the formulation of this Biodiversity Strategy and Action Plan (BSAP) and the development of the National Environment Strategy (NEMS) in 1992.”

Also in the legislative agenda is the pending enactment of the Environment Bill and the Integrated Environment Planning and Management Bill. Governance developments have also flagged the drafting and enacting of ‘bio-prospecting regulations to protect traditional knowledge applicable to the use of the biological resources of Niue’<sup>132</sup> (Action Point 1.3).

While progress appears to be encouraging there is criticism that Niue's current legislative framework is not comprehensive enough; and where in the limited areas that it does exist it is poorly regulated and enforced. This creates a position where the strategies and plans may fulfil international and regional pressures; but fail to have any impact locally. There are initiatives contained in the NNBSAP that contain no clear timeframes; and appear to be sentiments of goodwill rather than firm action.

Traditional knowledge is mentioned throughout the NNBSAP and throughout other official documents; but little information is given regarding what ‘traditional knowledge’ exists, what it covers in a substantive sense, and how it is used. Where traditional knowledge is commented on it is usually in relation to its declining status rather than any clear measures for its protection or use to assist in the conservation or sustainable use of biodiversity. To this end “it was not felt appropriate to develop specific actions for this in the Action Plan”.

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<sup>131</sup> Second Annual Report (Niue) on the Convention on Biological Diversity available at <http://www.biodiv.org/world/map.asp?ctr=nu>.

<sup>132</sup> Theme 4, Objective 1, Action Point 1.3.

**Palau**

There is currently no legislation in Palau that deals specifically with the protection of TK, although there is work in progress on Protected Areas Network legislation currently before the National Congress which is proposed to provide a measure of recognition and protection for TK (Response to Questionnaire: Q12). In addition the draft NBSAP for Palau provides under Theme 9:

**“Theme 9: Maintenance and Protection of Traditional Knowledge and the Fair and Equitable Sharing of Benefits for Traditional Resource Owners and Communities.**

*Vision: Traditional knowledge is passed down from generation to generation and therefore maintained and protected in a culturally appropriate manner through time. Traditional resource owners and communities are fully involved in resource management and are the primary beneficiaries of their knowledge and the conservation and sustainable use of Palau’s biodiversity.”*

The NBSAP is currently in the process of being developed and is expected to be finalised by the end of 2003 (Holm, Tarita, per comms).

Govt. Report to the World Summit on Sustainable Development (April 2002) accessible at <http://www.pacificwssd.org/html/documents/WSSD/Documents>.

The 1981 Republic of Palau Environmental Quality Protection (EQPB) Act is the most comprehensive environmental law in Palau. There are several sets of regulations and minor pieces of legislation that sit alongside it also. However, the EQPB is given little specific direction by statute and does not have broad authority to limit development.

Since 1992, the States and traditional leaders, through legislation and traditional conservation practices have protected over 458 km<sup>2</sup> of their natural reserves through a system of conservation areas, marine preserves, fish spawning areas, wildlife preserves and sanctuaries. Nationwide, marine areas have been protected at a rate of 50 km<sup>2</sup> per year from 1992-2001. All ecosystems are represented in these managed areas, including more than 17% of all the mangroves, the inner-reef areas in 8 States, two of the three atolls, twelve major channels or passes, and the two largest watersheds in Palau including the only freshwater lake.

**Samoa**

Lands and Environment Act 1989 defines the work of the Division of Environment and Conservation. One of the principal functions is to “ensure and promote the conservation and protection of the natural resources and environment of Western Samoa”<sup>133</sup> ([www.biodiv.org](http://www.biodiv.org)).

The more specific items of legislation relevant to Biodiversity Conservation are the National Parks and Reserves Act 1974, to establish and manage protected areas in Samoa; the Protection and Conservation of Wild Animals Regulations 1993, to protect threatened and endangered wild animal biodiversity of Samoa; and the Local Fisheries Regulations 1995; to protect fish harvesting sizes and conservation measures<sup>134</sup> (ibid).

The Village Fono Act 1989 recognises the traditional management systems for the control of village resources and village management. This act ensures consultation takes place in preserving biodiversity.

The Access to Genetic Resources Regulations regulate access to Samoa’s genetic resources and the equitable sharing of benefits derived from its uses.

<sup>133</sup> Division of Environment and Conservation Department of Lands Survey and Environment Apia, Samoa, *Government of Samoa National Report to the Convention on Biological Diversity* (Apia 1988) p 10, at CBD website: [www.biodiv.org](http://www.biodiv.org).

<sup>134</sup> Ibid, p 10-11.



Samoa is also supporting the ongoing work and developing a draft model law to be known as the Traditional Biological Knowledge, Innovations and Practices Act which is intended to protect the rights of owners of traditional knowledge related to biodiversity<sup>135</sup>.

This model law is generally supported by the South Pacific forum countries including Australia, Cook Islands, Federated States of Micronesia, Fiji, Marshall Islands, New Zealand, Palau, Samoa and Vanuatu. The proposed law is more in the character of a domestic law than a regional treaty and targets infringements of a commercial nature in relation to unauthorised use of traditional knowledge relating to biodiversity<sup>136</sup> (ibid, 8).

## 2.6 Summary and Conclusions

### *Cook Islands*

In a news release earlier this year<sup>137</sup>, Cook Islands Cabinet Minister Tangata Vavia commented that his country had long conceptualised protecting the local environment (<http://www.cook-islands.gov.ck>).

However, the minister then admitted to UNDP representatives that it had only been in the last decade that local people had realised a real need to do something about it.

The Cook Islands depend largely on the co-operation and vision of organisations such as the UNDP whose initiatives include launching a two-year National Strategy and Action Plan Add-On Project<sup>138</sup> (<http://unfccc.int/program/sd/technology/teasia.html>).

Other current issues include approving a National Capacity Self Assessment Project to develop a Global Environment Facility Proposal. This will address the Cook Islands' obligations under the Rio Conventions on biodiversity. These initiatives still do not address Cook Island's lack of protection for traditional knowledge in nearly all categories of research with the exception of rā'ui in marine ecosystems which commands attention from both state and non-governmental organisations.

The overwhelming focus for the Cook Islands is adhering to international standards for environmental protection. Traditional knowledge in Cook Islands is currently undervalued and under-researched. Key areas requiring attention include:

- Plant genetic resources for food and agriculture;
- Animals and micro-organisms for food and other purposes;
- Traditional medicinal data;
- Forest;
- Mountain and Valley.

### *Fiji*

<sup>139</sup>As a party to the Convention of Biodiversity, Fiji is obligated to take a number of measures and controls to protect its biodiversity through the formulation of a Biodiversity Strategy and Action Plan (BSAP) ([www.fijilive.com](http://www.fijilive.com)). The Fiji government is committed to the protection and conservation of a variety of life forms, plants, animals, micro-organisms and the ecosystems they form.

Fijians noted that the uniqueness of this biodiversity would be a living treasure and forming a natural heritage within the island nation. Through BSAP Fiji would ensure the participation of landowners and traditional knowledge of biodiversity and its uses and the development of their own local management strategies.

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<sup>135</sup> Draft model law on Traditional Biological Knowledge, Innovations and Practices Act 200X, preamble.

<sup>136</sup> Ibid, notes to the Act, p 8.

<sup>137</sup> <http://www.cook-islands.gov.ck> - News Releases "Environmental Awareness Nothing New" 12 March 2003.

<sup>138</sup> <http://unfccc.int/program/sd/technology/teasia.html> - Cook Islands Country Paper "Transfer of Technology Consultative Process", Asia and the Pacific Regional Workshop, 17-19 January 2000, Philippines.

<sup>139</sup> [www.fijilive.com](http://www.fijilive.com).

***Micronesia***

The FSM is still a very young Nation with very limited resources. As it has been a colony in one form or another for an extended period of time, there has been little effort in maintaining cultural practices and values at an institutional level. This has mainly been done at the family level, which is now being eroded at an alarming rate.

As a result of this, there is very little in the way of institutional recording of data and capacity building. Most work in this area appears to be the result of efforts at the community level and by NGO's.

***Palau***

Palau has one of the richest areas of biodiversity in the Pacific region, and although it is ensuring retention of TK/TEK through the HPO, the impression is that the Nation is relying predominantly on western science in the sphere of conservation and sustainable use of biodiversity.

**[Recommendations – Cook Islands**

- 1 Due to a lack of response from Government and NGOs on the Cook Islands (and other islands) there is a perceived need to meet directly with these agencies to extract the appropriate research information to complete this report. This could be part of stage two of the research project.]

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