An Assessment of Indigenous Environmental Knowledge (IEK) in the Pacific Region to Improve Resilience to Environmental Change

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This scoping study on Indigenous environmental knowledge in the Pacific region has been conducted for the Climate Change Research Centre of the University of New South Wales in Sydney, Australia. Appreciation is extended to all those who responded to this survey on Indigenous environmental knowledge and its use in building resilience to environmental change.

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Acronyms:

CBO	Community-based organization
CRI	Crown Research Institute (NZ)
CROP	Council of Regional Organizations in the Pacific
CSI	Coastal Regions and Small Islands (a UNESCO initiative)
ESCAP	Economic and Social Council for Asia and the Pacific
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FSPI	Foundation of the Peoples of the South Pacific
GEF-SGP	Global Environment Facility Small Grants Programme
IEK	Indigenous environmental knowledge
IGCI	International Global Change Institute
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature and Natural Resources
LDC	Least Developed Country
LINKS	Local and Indigenous Knowledge Systems (a UNESCO initiative)
LMMA	Locally-Managed Marine Area
MNRE	Ministry of Natural Resources and Environment (Government of Samoa)
NAPA	National Adaptation Programme of Action
NGO	Non-government organization
NIWA	National Institute of Water & Atmospheric Research (NZ)
PACC	Pacific Adaptation to Climate Change
PICTs	Pacific Island Countries and Territories
SOPAC	Pacific Islands Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Environment Programme
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USP	University of the South Pacific
WHO	World Health Organization
WMO	World Meteorological Organization
WWF	World Wide Fund for Nature

Section A: Background

A.1: The Pacific Region

The Pacific has been aptly described as the last frontier[1] for human settlement. Some 25,000[2] islands lie scattered over the world's largest ocean whose area, covering about 28% of the global surface, is larger than the total land area of the world[3]. Pacific Island Countries and Territories (PICTs), fall into three sub-regions based on ethnic, linguistic and cultural differences: Melanesia lies to the west of the great ocean, Micronesia is north of Melanesia, and Polynesia is in the central and southeast region bounded by Hawaii in the north, New Zealand in the southwest corner and Easter Island lying thousands of miles to the east (Figure 1, Table 1).

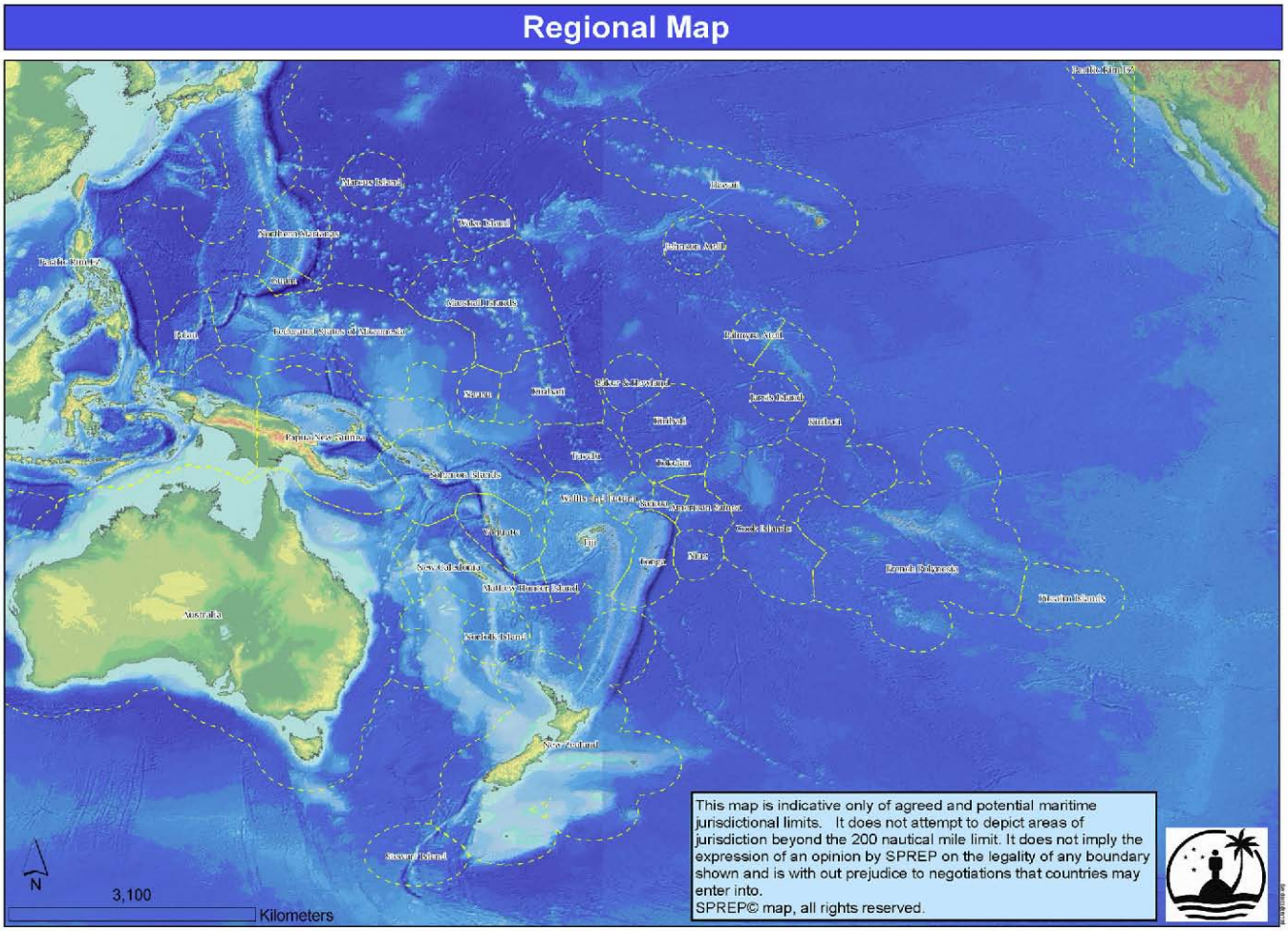

Figure 1: Map of the Pacific Region (courtesy of SPREP)

The islands of the Pacific region vary in size, shape and habitat ranging from mostly tropical environments to sub-tropical, temperate and even sub-Antarctic. In terms of land area, Papua New Guinea comprises 83 per cent of the region's landmass, while Nauru, Pitcairn, Tokelau and Tuvalu are each smaller than 30 square kilometres. Some of the PICTs such as Niue and Toeklau, are very small and consist of one or a few islands. At the other extreme, island groups such as Tonga, Kiribati, French Polynesia and the Federated States of Micronesia, include more

[1] Howe, K. R., Vaka Moana – Voyages of the Ancestors, Auckland War Memorial Museum, David Bateman Ltd., 2006
[2] Wikipedia: http://en.wikipedia.org/wiki/Pacific_Ocean
[3] Central Intelligence Agency, The World Factbook, https://www.cia.gov/library/publications/the-world-factbook/geos/zn.html

than a hundred islands spread out over huge distances.[4]

Despite this diversity, there is much in the human and natural landscape that is common to the people living in the islands. Ancestors of present day Pacific people crossed vast tracts of ocean to reach their island homes. This voyaging tradition would have greatly enhanced an important knowledge base for Pacific peoples; understanding the sea and its creatures living above and below the waves, and knowledge of shallow and deep ocean navigation and voyaging with particular references to waves, currents, winds, and stars. Once arrived, early settlers would have started learning about their new environments, building on knowledge carried with them from their homelands.

Some islands offer natural environments that are rich in flora and fauna while others are impoverished. Whatever the conditions, those settling in the islands demonstrated a long-term resilience borne of a basic human capacity to endure hardship. Agriculture and fishing, whether for commercial or subsistence use, are the main activities for most of the region's population[5], and traditional knowledge concerning these activities has evolved over long periods of time, developing in many localities to high levels of understanding. The coastal area with its vulnerability to the impacts of climate change is particularly important given that roughly 80% of the population in the Pacific Islands live in this area.

Pacific peoples also have a common heritage involving the presence of Missionaries and early European traders and settlers, in some case for well over 200 years. Many Pacific Islands were colonized[6] by Western nations in the 19th and early 20th centuries. The era of decolonization in the Pacific region began in the 1960s with Samoa gaining independence in 1962 after over 50 years of concerted effort to achieve this goal. It is certain that foreign presence has eroded Indigenous knowledge, oftentimes deliberately and systematically. While a resurgent interest in the Indigenous reference to current problems offers some hope for capturing knowledge systems of Pacific peoples, it is generally accepted that much of the Indigenous traditional environmental knowledge has been lost.

The Secretariat of the Pacific Community (SPC) estimates the population of the Pacific Islands to reach 9,498,900 by mid-2008, growing by 1.9% annually which resembles a yearly growth of 180,000 people or about 500 people per day. This growth notwithstanding, population distribution has remained largely unchanged: Melanesia accounts for the vast majority (8,310,300 or 87.5%) of the regional population, followed by the much smaller island countries and territories of Polynesia (655,300 or 6.9%) and Micronesia (533,300 or 5.6%). The largest individual country population is that of Papua New Guinea, which has an estimated 6,473,900 people, followed by the Fiji Islands with approximately 839,300 people. The smallest are Tokelau, with 1,200 people, and Niue, with 1,500 people (apart from Pitcairn Island, which has 66 people). The fastest-growing populations are those of Guam (2.8%), due to the influx of military personnel and their dependants, as well as migration from other countries, followed by Solomon Islands (2.7%) and Vanuatu (2.6%), whose high growth rates are due to high natural increase (high birth rates). There are also populations that are decreasing in size, such as those of Niue (-2.4%), due to continuous emigration of its people to New Zealand, and the Northern Mariana Islands (-1.7%), which suffered from the closure of many of its garment factories and a subsequent loss of employment. Countries with the highest proportion of children aged younger than 15 years, comprising more than 40% of their total population, are the Marshall Islands (41.0%), Samoa (40.6%) and Solomon Islands (40.3%) while countries with the highest proportion of people aged older than 60 years, comprising more than 10% of their total population, are Niue (15.6%), Tokelau (11.4%), the Cook Islands (11.2%), New Caledonia (10.5%), Wallis and Futuna (10.5%) and Guam (10.2%).[7]

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[4] SPC: http://www.spc.int/corp/index.php?option=com_content&task=view&id=15&Itemid=41
[5] SPC: http://www.spc.int/corp/index.php?option=com_content&task=view&id=15&Itemid=41
[6] Western nations colonizing the Pacific included Great Britain, France, Germany, and the United States
[7] SPC Statistics and Demography Programme, www.spc.int/sdp, retrieved 4 June 2008

Table 1: Pacific Island Countries and Territories and Political Status

REGION / PICT	Political Status	Land area (km_)	Estimated population Mid-Year 2008
MELANESIA		**540,248**	**8,310,329**
Fiji Islands	Independent Nation	18,272	839,324
New Caledonia	Overseas territory of France	18,576	246,614
Papua New Guinea	Independent Nation	462,840	6,473,910
Solomon Islands	Independent Nation	28,370	517,455
Vanuatu	Independent Nation	12,190	233,026
MICRONESIA		**3,156**	**533,300**
Federated States of Micronesia	Independent Nation	701	110,443
Guam	Territory of the United States	541	178,980
Kiribati	Independent Nation	811	97,231
Marshall Islands	Independent Nation	181	53,236
Nauru	Independent Nation	21	10,163
Northern Mariana Islands	Commonwealth in political union with US	457	62,969
Palau	Independent Nation	444	20,279
POLYNESIA		**7,986**	**655,266**
American Samoa	Territory of the United States	199	66,107
Cook Islands	Self-governing, in free association with NZ	237	15,537
French Polynesia	Overseas territory of France	3,521	263,267
Niue	Self-governing, in free association with NZ	259	1,549
Pitcairn Islands	Overseas territory of the United Kingdom	5	66
Samoa	Independent Nation	2,935	179,645
Tokelau	Territory of New Zealand	12	1,170
Tonga	Independent Nation	650	102,724
Tuvalu	Independent Nation	26	9,729
Wallis and Futuna	Overseas territory of France	142	15,472
TOTAL		**551,389**	**9,498,895**

Source: SPC Statistics and Demography Programme, www.spc.int/sdp, retrieved 4 June 2008

Two other countries not listed in Table 1 but included in the scope of this study are New Zealand and Hawaii which fall in the sub-region of Polynesia.

While most of the islands in the Pacific have a predominant Indigenous population, there are some countries with high numbers of non-Indigenous inhabitants. In 2001, Fiji had an Indigenous population of 54.8%, Maori were the largest minority group at 7.9% of New Zealand's population, Hawaiians number less than one-third of the population in their State, and many Micronesians are known to have Japanese ancestry. There are some populations experiencing low or even declining population growth. International migration for example has resulted in more people from the Cook Islands, Niue and Tokelau living overseas (mainly in New Zealand) than on their home islands.

In terms of social organization and cultural practices, in Melanesia, social and political status is traditionally acquired through individual merit; in Polynesia, descent is also an important factor; and in the atolls of Micronesia, either descent or old age customarily confer seniority. All Pacific Islanders attach great cultural importance to land, and three out of four Islanders still live in rural areas[8]. Much of the land throughout the region is held under traditional or customary tenure systems characterized by subsistence agriculture and fishing; important components of food security and sustainable livelihoods.

A.2: Human Resources

Human resources for IEK can be divided into seven distinct groups:

- **Traditional knowledge holders**

[8] SPC: http://www.spc.int/corp/index.php?option=com_content&task=view&id=15&Itemid=41

This group encompasses those who hold traditional knowledge from traditional communities in accordance with traditional or customary law and practices. The term 'holders' is intended to convey the relationship between a community and its traditional knowledge, often seen as custodianship or responsibility, and is considered more appropriate than the term 'owners'[9].

Indigenous people are the primary custodians of land, for the most part held under customary tenure, and other environmental resources impacted by climate change. Within the Indigenous populations of each country there are many people who share common knowledge about the environment and the interlinkages within it. There are also a dwindling number of practitioners of highly specialized knowledge such as traditional healers.

It is the indigenous people who are in direct and constant contact with their changing environment who, after centuries of exposure to a wide range of vulnerabilities, acquired and continue to acquire knowledge aimed at minimizing risks to livelihoods brought about by the changes experienced. Beyond the natural instinct to survive when faced with crisis, traditional knowledge systems also provided a framework for social and cultural coherence, food, shelter, healing and innovative technologies.

While some organizations present in the region (Government, national, regional and international) have established contacts with local experts in Indigenous environmental knowledge, there is no known register that is region-wide and few countries will have developed such a list of human resources.

- **Community Based Organizations (CBO)**

  In this analysis, CBOs mainly comprise Indigenous people and can involve an entire village, district, or a group appointed by the village/district (in consultation with an outside organization) particularly if the activity requires local management or monitoring. Some CBOs comprise a small number of outsiders and may also include Indigenous people living in other localities (but with roots or other strong connection and socio-ecological interest in the area).

- **Governmental organizations**

  There are a number of Government ministries with varying degrees of interest and investment in IEK. These include conservation, environment, forestry, parks and reserves, agriculture, fisheries, meteorology, education, social development and culture. The degree to which IEK is documented and applied varies from ministry to ministry and from country to country and has also been influenced by how development partners, the donor community, view the relevance of such knowledge to the projects they are supporting. Most PICTs have limited, if any, financial and human resources committed to researching and documenting IEK although interest in this area has grown in the last decade.

  Quasi-government organizations such as State Owned Enterprises (SOEs) fall in this category. In New Zealand there are Crown Research Institutes which are government-owned tax-paying companies. One such entity, *Manaaki Whenua* (Landcare Research New Zealand Limited), is conducting research into traditional Māori knowledge systems.

- **International organizations and Development Partners**

  Many United Nations agencies (e.g. UNDP, UNEP, UNESCO, FAO, WHO, the UN Permanent Forum on Indigenous Issues), international development banks (World Bank, Asian Development Bank), and bilateral assistance programmes (e.g. European Union, AusAID and NZAID) are active in the Pacific and have some programmes with direct interest in IEK. The region is also increasingly accessing GEF grants such as for the South Pacific Biodiversity Conservation Program and current IUCN projects.

  A few international organizations helping people and the environment all over the world have offices in the region such as the United Nations (UNESCO, UNDP, FAO, WHO, WMO), the World Wide Fund for Nature (WWF), Conservation International (CI), and the Global Environment Facility Small Grants Program (GEF-SGP). In 2004, Niue, the smallest nation on earth, had 70 per cent of its infrastructure destroyed by cyclone Heta.

[9] This definition is taken from the Guidelines for developing national legislation for the protection of traditional knowledge and expressions of culture based on the Pacific Model Law 2002, Secretariat of the Pacific Community, 2006

Once the immediate needs of the population were met, Greenpeace began helping the Government to make Niue the first nation on earth to meet all its energy requirements from renewable sources[10].

- **Regional Organizations**

  Key regional organizations with interest in IEK who are also members of the Council of Regional Organizations in the Pacific[11] (CROP) include:

  - South Pacific Regional Environment Programme (SPREP, based in Samoa);
  - Secretariat of the Pacific Community (SPC, based in New Caledonia);
  - Pacific Islands Forum Secretariat (PIFS, based in Fiji);
  - University of the South Pacific (USP, based in Fiji);
  - Pacific Islands Applied Geoscience Commission (SOPAC, based in Fiji).

  The Pacific Plan (2006-2008) for regional cooperation and integration is looking into the creation of an institution to advocate for and protect traditional knowledge and intellectual property rights under the theme of sustainable development.

- **Non-Government Organizations (NGO) – National, International and Networks[12]**

  Conservation International (CI): CI has been most active in Melanesia (Papua New Guinea, the Solomon Islands, Vanuatu, Fiji and New Caledonia), where it has field operations in all but Vanuatu. It has recently established an office in Samoa and is reaching into countries of Polynesia. Its focus is on community-based resource management and conservation.

  The Nature Conservancy (TNC) TNC has programmes in the Federated States of Micronesia (FSM), Palau, Papua New Guinea, and the Solomon Islands. TNC's focus also engages people at the community level.

  World Wide Fund for Nature (WWF) – WWF's South Pacific Programme, headquartered in Suva, Fiji, operates projects in a number of countries in the region including Papua New Guinea, Cook Islands, Solomon Islands, Fiji. WWF focuses on raising capacity at the community level as well as providing assistance for specific conservation needs.

  The Foundation for the Peoples of the South Pacific (FSPI) is a network of like-minded NGOs who work at the grassroots level in nine Pacific countries. The main function of the FSPI Secretariat is to coordinate the planning and design of regional development projects, based on the needs identified by the members and their constituencies. FSPI has its regional office in Fiji and has country offices in Kiribati, Tuvalu and Vanuatu.

  Locally Managed Marine Resources (LMMA) is a network comprised of a group of practitioners involved in various community-based marine conservation projects around the globe who have joined together to learn how to improve our management efforts. The Network started out with only a handful of sites in 2000 and has grown to the current 302 LMMA sites covering over 10,000 sq km, with 329 protected areas covering at least 1,750 sq km[13]. As of 2006, close to 3000 people have been trained in LMMA approaches to marine conservation[14].

  Country NGOs: Rapid growth in the last 50 years means that over 1,000 NGOs now operate in the region although most do not have an environmental focus and even fewer are interested in IEK. While environmental concerns are often just part of the broader

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[10] Up in smoke? Asia and the Pacific; The threat from climate change to human development and the environment, The fifth report from the Working Group on Climate Change and Development, published by New Economics Foundation, November 2007

[11] The purpose of the Council of Regional Organizations in the Pacific, according to its charter, is to discuss and coordinate the work-programmes and policies of the different regional agencies to avoid either duplication or gaps in the provision of services to member countries.

[12] Some of the information presented in this section has been drawn from A Strategy for IUCN in Oceania, Concept Paper Prepared by the Oceania Regional Committee of IUCN, May 2003

[13] The Locally-Managed Marine Area (LMMA) Network, Improving the practice of marine conservation 2006 Annual Report: Enhancing LMMA Effectiveness through Continued Learning, 2006

[14] Ibid.

social agenda, there are some NGOs advocating for an Indigenous reference to assist address environmental concerns[15].

Most countries have a national umbrella NGO association. At the regional level, the Pacific Islands Association of Non-Governmental Organisations (PIANGO) is a regional network of NGO focal points or coordinating bodies based in 22 Pacific I\island countries and territories. PIANGO's primary role is to be a catalyst for collective action, to facilitate and support coalitions and alliances on issues of common concern, and to strengthen the influence and impact of NGO efforts in the region.

Also within the region, the Pacific Concerns Resource Centre (PCRC), based in Suva, Fiji, serves as the secretariat for the Nuclear Free and Independent Pacific (NFIP) movement, and acts for over 100 affiliated non-government and community organisations from around the Pacific. It has five campaign areas: demilitarisation; decolonisation; environment; human rights and good governance; and sustainable human development. PCRC has ECOSOC status with the United Nations – the only NGO in the Pacific to hold this status - and has been a consistent voice in international environment and trade negotiations.

NGOs and regional organizations with mandates in line with climate change/variability adaptation have played significant roles in community-based development. Their experience with community-level development, provision of technical advice, and carrying out research on climate change issues complement efforts by the national government and individuals to promote climate change adaptation[16].

- **Academic institutions.**

  There are many universities in countries all over world involved in research and field projects in islands throughout the Pacific region. Active universities within the region include the University of the South Pacific in Fiji in which the Faculty of Islands and Oceans has wide ranging research interests and field activities; the University of Hawaii, and the College of the Marshall Islands (CMI). A number of universities in New Zealand are also demonstrating increasing interest in researching climate change impacts and the role that Indigenous knowledge systems may play in responding to change. As an example, the International Global Change Institute (IGCI), based at the University of Waikato, carries out research that integrates knowledge on the natural and human dimensions of global environmental change for use in policy development and decision-making.

Annex I provides information on some of the above-listed organizations. The table is not a comprehensive listing of all the key organizations and people as the database reflect information received from cooperating respondents.

Section B: Indigenous Knowledge for resilience building

B.1: Nature and scale of environmental change

> "*We live in constant fear of the adverse impacts of climate change. For a coral atoll nation, sea-level rise and more severe weather events loom as a growing threat to our entire population. The threat is real and serious, and is of no difference to a slow and insidious form of terrorism against us*."
>
> Saufatu Sopoanga, Prime Minister of Tuvalu, September 2003

Media reports in the region indicate that Governments and NGOs in the Pacific perceive climate change as a *major concern* although an internet search reveals only four PICTs as having completed their National Adaptation Programmes of Action (NAPA)[17]. There has been little research into what Indigenous peoples in the region understand of climate change and its causes but anecdotal evidence suggests that this understanding can and should be greatly improved to

[15] One advocate who has represented the region in many conferences and workshops on Indigenous issues is Fiu Mataese Elisara Laulu of O le Siosiomaga Society Inc., and environmental NGO in Samoa.

[16] Mataki M, Koshy K, and Nair V, Implementing Climate Change Adaptation in the Pacific Islands: Adapting to Present Climate Variability and Extreme Weather Events in Navua, Fiji, published online by published on-line by Assessments of Impacts and Adaptations to Climate Change (AIACC), June 2006.

[17] Samoa (December 2005), Kiribati (January 2007), Tuvalu (May 2007), Vanuatu (December 2007). It is not known how many PICTs are obligated to develop their NAPA.

help with adaptation and mitigation efforts. A Samoan student studying in China is writing a thesis exploring, among other things, women's perceptions on environmental and climate changes and has offered these preliminary remarks from his research[18].

> Compared to the results from the nation wide consultation (and awareness) in the development of Samoa's NAPA (National Adaptation Programme of Action) that was carried out mid-2004, [the] women's perception on environmental and climate changes have expanded to a point where they know they must act locally (for their livelihood and conservation of the environment). Their scope of understanding of how activities in rich countries (release of gas emissions) is changing the global climate is limited. Most likely due to the way practitioners 'deliver' the message. The science to them is also not clear (due to 'delivery' and 'receiving' skills of both parties) and the awareness is only carried out at national consultations, where few participants from each social group (e.g., women's committee) attend. Whether or not the information is/was properly portrayed or passed on to the group back in the village needs to be taken into account. The concept of climate change is a mixed pot where some show a basic understanding while most don't. It seems that climate change awareness is not enough at the national level. It must be done village by village…
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> In a way, this lack of understanding (or basic understanding) has done little to change how people adapt to the changing environment or build their resilience. The women and men 'react' to changes rather than 'anticipate' changes to the environment. Jon Barnett (2001) believes this is a TEK trait of Pacific people - reacting to changes in the environment is normal, and these 'reactive' characteristics are part and parcel of what he thinks is a whole island socio-ecological resilience system used by islanders. Like exchange of food and money during *faalavelave* (family and social obligations) is resilience in action guarding from food insecurity throughout the island population. Food is exchanged everywhere all the time. This is a resilience trait that makes islanders adapt better than others. Barnett believes this approach to adaptation is better than the current 'no-regrets' approach used by government.

In Kiribati, two national adaptation consultations held in 2003 brought together chief councillors and clerks, and representatives of elders, women and youth groups from each of the major inhabited islands. For the first time, people realized that what was happening to one atoll was also happening to the others. The consultation led to a national consensus on the meaning of 'vulnerability' and a national prioritization of coping strategies[19].

> "*In recent times, most people perceived environment/climate change, especially the obvious rise of sea level in many parts of Tonga, as the unintended results of ignorance and poor development initiatives*."
>
> Sione Lanivia Faka'osi, Tonga Trust, email to author dated 18 May 2008

> *Indigenous people in Fiji perceive climate change as something that is caused by outsiders and feel victimised by the impacts*.
>
> Etika Rupeni, Foundation of the Peoples of the South Pacific International, Fiji, email to author dated 18 May 2008

Indigenous people who work every day in their environments are observing changes to the natural world. A young farmer[20] in Samoa related to the author how the seasons are no longer distinct. "*The wet and dry seasons no longer fall neatly into two separate timeframes and many farmers now plant at different times of the year. If rains wash away the seeds, we replant*." A fisherman[21] in Apia, Samoa, explained how in the two years he had been fishing in the area he had noticed a drop from around 4 – 5 fish species caught to 3 – 4. He has observed smaller fish sizes and an

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[18] Peni Leavai, <pleavai@gmail.com>, email to author dated 31 May 2008

[19] Bettencourt S., Croad R., Freeman P., Hay J., Jones R., King P., Lal P, Mearns A., Miller G., Pswarayi-Riddihough I., Simpson A., Teuatabo N., Trotz U., Van Aalst M., ***Not if but when***: Adapting to natural hazards in the Pacific Islands Region, A policy note, The World Bank East Asia and Pacific Region, Pacific Islands Country Management Unit, 2006

[20] Edwin Tamasese of Afiamalu

[21] Kingston Dean, 23, from Afega village. Kingston sets fishing nets at Mulinuu Point, Apia.

increasing volume of rubbish caught in his nets. He also referred to how his father used to go spear fishing beyond the reef by himself, a practice now strongly discouraged because of a "*changeable and less predictable nature of the sea*". In Satufia, Savaii, two birds, the *segavao* (blue-crowned lory) and *manutagi* (crimson-crowned fruit-dove), that were once seen in great numbers at certain times of the year are no longer seen[22].

Traditional societies in many countries including the Pacific region have built up knowledge over long periods about changes in the environment and have developed elaborated strategies to cope with these changes. However, traditional knowledge systems in mitigation and adaptation have for a long time been neglected in climate change policy formulation and implementation and have only recently been taken up into the climate change discourse[23]. Traditional and indigenous peoples, who have endured harsh environmental change, including climate change, may have useful lessons to offer about successful and unsuccessful coping strategies. Although Indigenous environmental knowledge may offer valuable insights for building resilience to environmental change, there is no government or non-organization known to be focussed specifically on documenting this knowledge for incorporation into learning initiatives at the community level. There are a number of organizations with documented tangential interest, i.e., where such knowledge can assist to achieve the primary aim of the organization, e.g., environmental conservation, crops diversification, protection of inshore fisheries, etc. All of the regional organizations listed in Section A.2 have, to varying degrees, interest in mainstreaming community-level access to IEK but commitment in terms of human and financial resources to develop resources remains unanswered and may best be addressed to the member countries of the CROP agencies first.

Climate change impacts on the social (including recreational) and cultural life of Pacific peoples, and is affecting island ecosystems, economic activity, and human health. This is having serious implications on the livelihoods and cultures of traditional and indigenous peoples[24]. Working Group II's contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change lists the following in relation to the impacts of climate change[25]:

- Small islands, whether located in the tropics or higher latitudes, have characteristics such as limited size, proneness to natural hazards and external shocks, which make them especially vulnerable to the effects of climate change, sea-level rise, and extreme events (very high confidence).
- Sea-level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, thus threatening vital infrastructure, settlements and facilities that support the livelihood of island communities (very high confidence).

  Sea-level rise is one of the unavoidable physical consequences of global warming, and is considered as the biggest challenge posed by global climate change for inhabitants of coastal regions (German Advisory Council on Global Change, 2006). Also, socio-economic impacts of sea-level rise have been much more studied than other climate change variables; and these studies emphasise on the economic aspect of sea-level rise rather than its impact on social and cultural systems (IPCC, 2001).
- There is strong evidence that under most climate change scenarios, water resources in small islands are likely to be seriously compromised (very high confidence).
- Climate change is likely to heavily impact coral reefs, fisheries and other marine-based resources (high confidence).

  The Pacific region harbours about a quarter of the world's coral reefs which are recognised as among the richest and most complex ecosystems in the world. Reefs are a

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[22] Observed by Sailimalo Vagauta of Satufia

[23] Macchi, M., Oviedo G., Gotheil S., Cross K., Boedhihartono A., Wolfangel C., Howell M., Indigenous and Traditional Peoples and Climate Change, Issues Paper, IUCN, March 2008

[24] Macchi, M., Oviedo G., Gotheil S., Cross K., Boedhihartono A., Wolfangel C., Howell M., Indigenous and Traditional Peoples and Climate Change, Issues Paper, IUCN, March 2008

[25] Mimura, N., L. Nurse, R.F. McLean, J. Agard, L. Briguglio, P. Lefale, R. Payet and G. Sem, 2007: Small islands. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 687-716.

significant environmental feature of Pacific Islands where the majority of the people live along the coastline and are heavily dependent on coastal resources for their livelihood. Island communities that depend on coral reef fisheries are even more vulnerable as they have limited livelihood alternatives and few choices of major food sources. Coral reefs also play a significant protection role, as they serve as natural barriers to wave action and protect from tsunamis and coastal erosion[26].

- On some islands, especially those at higher latitudes, warming has already led to the replacement of some local species (high confidence).
- It is very likely that subsistence and commercial agriculture on small islands will be adversely affected by climate change (high confidence).
- New studies confirm previous findings that the effects of climate change on tourism are likely to be direct and indirect, and largely negative (high confidence).
- There is growing concern that global climate change is likely to impact human health, mostly in adverse ways (medium confidence).

Migration – the most extreme form of adaptation

In time, one or more Pacific island countries will probably have to be completely evacuated because of flooding or saltwater contamination. The Carteret Islands (Papua New Guinea) and Tuvalu are likely to be the first nations to be evacuated due to climate change, but Kiribati, the Marshall Islands and many other parts of the Pacific may also have to face this catastrophe. Internal relocation due to shoreline erosion and rising sea levels has already occurred in Vanuatu, Kiribati and Tuvalu.[27] The three groups of coral atolls that make up Kiribati, home to an estimated 97,000 people, are barely two metres above sea level. In early June 2008, the President of Kiribati issued an appeal for Australia and other countries to provide a new home for his people believing that his nation will be unliveable in 50 – 60 years[28].

Impacts on the Pacific Ocean

Given that Pacific Islands lie scattered over the largest ocean in the world, ocean-related results of climate change are of particular significance. These impacts threaten humankind and natural ecosystems through extreme weather events such as tropical cyclones. While the number of them is not expected to rise due to climate change, several studies suggest that the strength of these events is very likely to increase affecting the many Pacific Island people living on coasts[29].

There is now irrefutable evidence that oceans are warming, and that this change will significantly impact marine ecosystems (Bindoff et al., 2007)[30]. Of particular concern are the unpredictable consequences on marine animal and plant species, as they are greatly influenced by water temperature. Increasing water temperature can lead to shifts of populations, the invasion of alien species, and even the disappearance of species (German Advisory Council on Global Change, 2006). Climate change is also leading to a reduction of water pH levels thereby increasing seawater acidification[31]. Acidification of seawater affects all marine calcifying species, such as certain plankton groups, clams, snails and corals, by hampering their calcification process (growth) and could even lead to dissolution of their skeleton. The net effect will have important repercussions on all associated species and the whole food chain.

Both scientific and anecdotal enquiry confirms that the Pacific environment is changing in detrimental ways although climate change is not the only cause. Several people commented during the course of this study that environmental change is a consequence of complex factors and that environmentally harmful human activities are being exacerbated by the impacts of climate change. Accepting greater local responsibility for behaviours and practices which can be changed may therefore help both adaptation and mitigation measures.

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[26] Macchi, M., Oviedo G., Gotheil S., Cross K., Boedhihartono A., Wolfangel C., Howell M., Indigenous and Traditional Peoples and Climate Change, Issues Paper, IUCN, March 2008

[27] Up in smoke? Asia and the Pacific; The threat from climate change to human development and the environment, The fifth report from the Working Group on Climate Change and Development, published by New Economics Foundation, November 2007

[28] http://www.radioaustralia.net.au/programguide/stories/200806/s2266326.htm, retrieved 5 June 2008

[29] Macchi, M., Oviedo G., Gotheil S., Cross K., Boedhihartono A., Wolfangel C., Howell M., Indigenous and Traditional Peoples and Climate Change, Issues Paper, IUCN, March 2008

[30] Ibid.

[31] Ibid.

B.2: Indigenous Knowledge in use for adaptation

> "*It is popular to think that Indigenous knowledge is fundamentally different from science but as I get more and more into Indigenous knowledge and I learn more about science, I discover that in fact the boundaries that do exist are actually porous and there are things that can cross through to form relationships*".[32]
>
> Charles Te Ahukaramu Royal, Mauri Ora Ki Te Ao, Living Universe Ltd.

Indigenous peoples, including those living in the Pacific region, are among the first to face the direct consequences of climate change, owing to their dependence upon, and close relationship with the environment and its resources. Traditional and indigenous communities are highly reliant on natural resources which they use in many different ways - as food, wood for timber or fuel, fibre for clothing, medicinal plants for health care, materials for income generating activities – and depend on for spiritual purposes[33]. Although they contribute very little to the underlying causes of climate change, indigenous peoples are helping enhance the resilience of ecosystems they inhabit and are interpreting and reacting to the impacts of climate change in creative ways, drawing on traditional knowledge and other technologies to find solutions which may help society at large to cope with impending changes.[34].

A feature common to many if not all Pacific Island societies is the role of elders and the respect accorded to them. The role of the *matua* (elders) is to nurture the young so that the young will inherit from them the stories of their struggles and survival, their values, their *alofa* (love) and their vision for the future[35]. While older people may be the primary guardians of Indigenous knowledge, young apprentices often bid to outdo their elders and in this way expand the boundaries of knowledge which may otherwise remain limited.[36] In some societies, traditional knowledge is conveyed from one generation to the next through family guilds or groups of experts localized in a particular area, often close to a special environmental feature or a component needed when using or expressing the knowledge (such as an uncommon plant or tree).

Indigenous knowledge is esoteric by nature and the degree of sacredness or openness can vary across cultures and contexts[37]. *Explicit* Indigenous knowledge can be defined and learned such as the names of edible marine invertebrates and reef fish, fruiting and harvesting seasons, mating seasons for birds and animals, and the names and uses of medicinal plants. *Tacit* Indigenous knowledge which is understood indirectly, by implication, is more difficult to articulate and draws on the values and world-view borne of a slowly evolving culture[38].

A common thread among Indigenous people throughout the Pacific region is their holistic approach to life and the many complex yet harmonious relationships that exist.

> *In the balance of life, all living things share equal status and power...*
>
> *In ancient Samoa protocols were developed to ensure that the environment was preserved. During times of re-growth certain trees and plants were prohibited from being cut or picked. These protocols and the tapu associated with them provided a conservation plan that dictated what man could take from the environment, when and how much. Such a plan prioritised need rather than profit. In this context the taking of natural resources was never to go beyond what nature herself could not sustain in terms of natural re-growth. Tasks associated with fishing, planting, harvesting and building were therefore coordinated in*

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[32] Stated in an interview with the author at "Across Oceania – Te Au o te Moana" Symposium on Governance and Responsibility for Water Ecosystems, Tofamamao Conference Centre, Samoa, 26 – 30 January 2008

[33] Macchi, M., Oviedo G., Gotheil S., Cross K., Boedhihartono A., Wolfangel C., Howell M., Indigenous and Traditional Peoples and Climate Change, Issues Paper, IUCN, March 2008, p 22.

[34] Climate Change, Bio-cultural Diversity, and Livelihoods to be focus of UN Forum, United Nations Permanent Forum in Indigenous Issues, Press release dated 16 April 2008

[35] Tui Atua Tupua Tamasese, Allusions, Specifics and Mental Health, National Symposium on Mental Health Issues in Samoa, 8 – 11 April 2003.

[36] Based on thoughts shared with the author by Mr. Mali Voi, Cultural Advisor, UNESCO Office for Pacific States, 1 May 2008. The downside of this, he pointed out, was that some experimentalists have been known to be poisoned in their pursuit of new knowledge.

[37] Karlo Mila-Schaaf, Discussion Document and Summary of Key Pacific Themes, Ethics of Knowledge Production Conference, New Zealand National Commission for UNESCO, November 2006.

[38] Tavana, Namulauulu G.V., Traditional knowledge is the key to sustainable development in Samoa: examples of ecological, botanical and taxonomical knowledge, National Tropical Botanical Garden, Hawaii.

accordance with predetermined cosmic and environmental timings. Here the harmony between man and the environment is most pronounced.[39]

In March and April 2007, 13 regional consultation *hui* (meetings) with Māori were held throughout New Zealand to discuss climate change issues and options proposed in discussion documents prepared by the NZ Government. In the summary report of key findings it is stated that from an environmental and spiritual perspective, Māori indicated that they see the world as a unified whole, where all elements, including *tangata whenua*[40], are connected through *whakapapa*[41]. This world-view applies also to perceptions of change. One Maori respondent[42] in this survey on Indigenous environmental knowledge referred to how climate change needs to be seen as being part of a *whole relationship to the environment, environmental health and well being*.

Climate has always been important for Māori. It affects the winds, waves, and ocean currents, influences which plants, trees, and birds are found in various parts of the country, and impacts the social, economic and cultural well being of individuals and communities. Through the generations Māori have built up extensive knowledge of local climate, from the character of local winds and rain to the forecasting of drier and warmer summers. These forms of knowledge have traditionally helped to make important decisions about the best time to farm, fish and navigate, among other activities. However, despite this local knowledge and the resilience that it brings, some Māori communities face obstacles related to climate change which increase their vulnerability and heighten their socio-economic risks.[43]

Te Au o te Moana - Across Oceania is one of the most recent events held in the Pacific region specifically recognizing the value of indigenous knowledge. The project brief for this symposium on governance and responsibility for water ecosystems explains that "*engaging with Indigenous knowledge is to ensure that the longer experience and wisdom of the Pacific is included with western scientific responses to the environmental crisis. Working with Indigenous knowledge and science together, and on shared decision-making with all interested parties is to build examples of whole system approaches to governance and management of water*.[44]"

Indigenous knowledge systems pertaining to climate and weather are poorly documented throughout the region and require research for a better understanding of this important part of IEK to emerge. The National Institute of Water & Atmospheric Research (NIWA), established in 1992 as one of nine New Zealand Crown Research Institutes (CRIs), has recently commissioned research into traditional knowledge of climate and weather used by the Samoan and Māori. This work was in response to a common theme emerging from numerous workshops and conferences in the Pacific region on climate change over the last decade. While such gatherings acknowledge and value the role of Western science in improving their understanding of climate variability and change, they place much greater emphasis on the importance of documenting traditional knowledge and local observations in any response to climate change[45]. An organization such as NIWA may be in a good position to extend their research into other Indigenous communities of the Pacific region particularly in the PICTs they are active in with weather forecasting and monitoring. Opportunities also exist for NIWA to work not only with Governments and NGOs in the region, but also with like-minded organizations active in the Pacific region such as the National Oceanic and Atmospheric Administration (NOAA) of the US Department of Commerce[46] and universities such as the University of the South Pacific.

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[39] Tamasese, Tui Atua Tamasese, In Search of Harmony: Peace in the Samoan Indigenous Religion; Interreligious Dialogue - A Colloquium Organised by the Pontifical Council, Vatican City, Rome, Italy, 12 – 15 January 2005

[40] Literally people of the land

[41] Lineage, genealogy

[42] Diane Menzies, International Federation of Landscape Architects, 8 May 2008

[43] Climate and Māori, National Institute of Water & Atmospheric Research, accessed 8 May 2008 from http://www.niwa.cri.nz/ncc/maori

[44] Across Oceania – Te Au o te Moana Symposium on Governance and Responsibility for Water Ecosystems, Tofamamao Conference Centre, Samoa, 26 – 30 January 2008

[45] Lefale, P.F., Traditional indigenous knowledge of weather and climate, forecasting; the Samoa Experience (2008 - Draft)

[46] NOAA have established two Marine Protected Areas in Hawaii and American Samoa and have supported activities in other US Territories in the Pacific region.

In Samoa, the Fisheries Division of the Ministry of Agriculture, Forests, Fisheries and Meteorology (MAFFM), has established Village Fisheries Management Plans in over 80 villages[47]. The VFMP is designed to motivate and engage village communities to undertake responsible actions in order to manage their subsistence fisheries and marine environment[48]. Briefly, villages take charge of their marine resources making their own rules and regulations concerning sustainable access to marine resources. These rules include traditional practices such as seasonal bans on fishing, restricted fishing grounds and no-take zones, and the use of approved fishing or harvesting methods. That is not to say that all Indigenous knowledge and practice is environmentally sustainable. Many communities in Samoa specifically ban destructive fishing practices such as coral smashing (known as *tu'iga ma faamo'a* in Samoa) and the use of fish poisoning plants (*ava niukini*), bleach and dynamiting. These 'traditional' methods were once widely used to catch fish.

> *"The toea'ina (old men) knew when there was going to be a prolonged dry period and when the drought would end. They knew which plants to grow in dry weather and which to plant during prolonged wet spells."*
>
> Samoan respondent

Weather forecasting

Indigenous communities throughout the Pacific region have their own ways of predicting weather. While there are some similarities in methodologies used such as observable seasonal change, identification of cloud formations and other natural environmental changes, and animal[49] behaviour, there can be great variation in the interpretation of these observations. It should also be noted that natural signals that were used to trigger activities in the past are now less reliable[50]. As the weather becomes hotter in the tropics, migratory birds come at a different period of the year and the rainy season comes earlier or later than usual, which can lead to a disorientation of people in their daily lives. In Kiribati, it is observed that climate related hazards are being exacerbated and that traditional coping strategies are becoming ineffective in coping with this level of change[51].

> *The Maori language includes numerous words and phrases that define types and stages of climate and weather states. These words/phrases would often guide important times for economic (cropping, farming etc) activity, or food gathering like fishing and hunting as target species behaviour and activity would follow certain weather and climate events. Importantly this knowledge of climate and weather activities is intergenerational being transferred from generation to generation (often only orally). This is one important difference between how Maori think about climate compared to more western thinking around climate*[52].

Coping with environmental change

People living in the Pacific have had to cope with a range of severe weather events such as cyclones, flooding, and drought. Over time and with repeated direct experience, strategies were developed to enhance adaptive resilience in times of crisis.

Indigenous environmental knowledge has supported a rich natural and cultural heritage throughout the Pacific region. Like the environment itself however, much of this knowledge began to decline with the arrival of foreign ideology, theology, technology and goods. Briefly, Indigenous knowledge systems, and the values and worldviews that sustain them, have been eroded over a relatively short span of time beginning with early trading, missionary and colonial periods to the current world embracing throes of globalization. Valuable information, including much of the highly specialized language used to convey knowledge from one generation to the next, has been lost.

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[47] The Fisheries Extension Programme in Samoa was established in 1995 with the assistance of AusAID

[48] Review of Village Fisheries Management Plan, of the Extension Programme in Samoa, SPC, 2001

[49] Animals observed in traditional Samoa weather forecasting include birds, cockroaches, and the hermit crab

[50] Macchi, M., Oviedo G., Gotheil S., Cross K., Boedhihartono A., Wolfangel C., Howell M., Indigenous and Traditional Peoples and Climate Change, Issues Paper, IUCN, March 2008

[51] National Adaptation Program of Action, Republic of Kiribati, January 2007

[52] Chris Karamea Insley, Global Change Institute, Waikato University, New Zealand, email to author dated 18 May 2008

A Samoan farmer and fisherman from the village of Satufia on the south coast of Savaii offered an interesting observation of how people in his village prepared for tropical storms[53]. During recent cyclones, many villagers throughout Samoa sought shelter in damaged water tanks but he recalled how, in earlier times, a very large tree was deliberately felled by the *toea'ina* (elder men) and allowed to be overgrown with vegetation to create a natural bivouac for shelter during the season when storms were anticipated. Knowledge anticipating climate variability was known to Indigenous people throughout the Pacific region where ability to forecast correlates to the capacity to read explicit and hidden messages in the natural world as observed in animal behaviour, expressions in the plant kingdom, cloud formations, and the night sky.

The importance accorded to environmental knowledge by Indigenous people is reflected in its widespread use in cultural expressions. Direct reference to environmental knowledge can be found in songs, dances, rituals, and proverbial expressions throughout the region.

Local observations of a changing environment

There is a common view in the Pacific region that climate is changing and affecting people's livelihoods. Waves are higher than they were a decade ago; the frequency and severity of storm events that leave behind damaged infrastructures costing millions of dollars have increased; landward movement and erosion of coast lines, droughts causing losses to farmers and the countries' economies, coral bleaching and the increase in waterborne diseases etc. These are some of the new experiences that the peoples of the Pacific are grappling with as a result of a changing climate[54]. Specific examples include[55]:

- Flowering seasons of fruit trees in particular are changing and it seems that breadfruit for instance now fruits all year round.
- Farmers follow two main seasons in the Pacific (hot-wet and the cold-dry) in planning and implementing their farming activities, many find it quite difficult to follow the seasons now as many feel there is no longer a clear distinction between the two. This impacts on production and income (Fiji in particular).

> "*A aiga le mafua i uta, e aiga fo'i le mafua i tai*"
> (Samoan proverb)
> When trees are heavy with fruits and berries (to fatten pigeons), there will be plentiful stocks of small fish (to fatten skipjack tuna). An indicator for the best time to go hunting and fishing.

B.3: Applying Indigenous Environmental Knowledge

Although IEK is framed within the parameters of a certain place and period of time experienced by people in that area, the analogous milieu of island ecosystems and climatic conditions combine with comparable world-views and interactions taking place with and within the natural world, result in corresponding knowledge systems. A good example of this is the use of *tapu*[56] (forbidden or sacred place or action) to influence behaviour.

Variations of *tapu* can be found throughout the region and its practice is still in use in many Pacific Islands to lesser or greater extents. Figure 2 for example shows a map from Fiji of the Cuvu Tikina Management Plan which clearly delineates the *tabu* areas[57].

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[53] Sailimalo Vagauta, 53

[54] Taito Nakalevu, email to author, 19 May 2008

[55] Ibid.

[56] Among the many discoveries of Captain James Cook was a linguistic one, the term taboo. In a journal entry from 1777, Cook says this word "has a very comprehensive meaning; but, in general, signifies that a thing is forbidden.... When any thing is forbidden to be eat, or made use of, they say, that it is taboo." Cook was in the Friendly Islands (now Tonga) at the time, so even though similar words occur in other Polynesian languages, the form taboo from Tongan tabu is the one we have borrowed. The Tongans used tabu as an adjective. Cook, besides borrowing the word into English, also made it into a noun referring to the prohibition itself and a verb meaning "to make someone or something taboo." From its origins in Polynesia the word taboo has traveled as widely as Cook himself and is now used throughout the English-speaking world. Online Etymology dictionary <http://dictionary.reference.com/browse/taboo> retrieved 12 May 2008

[57] Bowden-Kerby, A., Coral Transplantation and restocking to Accelerate the Recovery of Coral Reef Habitats and Fisheries Resources within No-Take Marine Protected Areas: Hands-on Approaches to Support

As a strategy, *tapu* may not be easily replicated in other regions given the cultural constructs that shape its use and the attitudes people have to those who invoke its application. Other regions and countries in the world with strong communal-based Indigenous societies may have their own ways of forbidding certain behaviours or geographic areas and of defining what is to be considered sacred and what is expected to maintain that sacredness.

In Micronesia, the need to document and revive the knowledge and practice of *mo* (the traditional system to designate parts of land, a whole island, or a reef area, as a restricted site), and of traditional environmental management in general, has been repeatedly emphasized in the Marshall Islands in work done since 1999 on planning for biodiversity conservation. The National Conservation Area Plan for the Marshall Islands (2007 – 2012) acknowledges the importance of reviving traditional knowledge and practice, while augmenting it with national and local government support for conservation.[58]

In the Cook Islands, *tabu* is known as *ra'ui*.

> *In the Cooks Islands, both the government and NGOs such as WWF are trying to revive traditional marine conservation practices known as ra'ui. Such a strategy, they argue, will provide a future for fish and people. The ra'ui is a traditional Cook Island practice where the harvest of natural resource is prohibited to allow stocks to build up. The ra'ui approach is promoted in the case of the management of the Muri lagoon in Rarotonga where tourism and residential developments have taken place in recent years. The Muri lagoon has obvious water circulation issue due to old fish rock traps set in channels causing high sedimentation as well as water quality issue caused by numerous new buildings and inappropriate sewage systems. Ciguatera or fish poisoning is highly prevalent in Muri lagoon and prevent most of the fishermen to fish in the area. In this case, it is doubtful that a ra'ui or a no take zone would be appropriate to solve the environmental problem of Muri. What is clearly needed is a better management of the land-based pollution, here the sewage system, in order to improve the water quality that will eventually allow coral to grow back and provide a better habitat for other reef species. Sewage is clearly a new threat that could not be resolved by traditional conservation practices as it did not exist in the past. This traditional Ra'ui should be used as one tool but not the unique one and it can be used when over-fishing or destructive fishing is taking place. It should be integrated in a broader management system that combines ancient and modern tools such as in the approach taken by* ***Locally-Managed Marine Areas*** *(LMMA) in several countries of the Pacific but mostly in Fiji. The equivalent of Ra'ui in Fiji is the tabu. In the LMMAs, the tabu, or permanent no-take zone, is one of the tools used to manage a marine area but other tools exist such as gear restrictions, seasonal closure or specie-specific refugia. The entire area is not tabu but is effectively managed. However this example can also be controversial as this LMMA example only deals with fishing, because over-fishing has been the main threat on their livelihoods for communities taking part in the LMMA approach. Although it is one step further than only using tabu or ra'ui, the next step would be now to find other tools to reverse new types of threat to livelihoods. A new kind of threat is what was experienced in the Cook Islands, or, as in the Solomon Islands, water quality can also be compromised by high sedimentation due to soil run-off to the lagoons from logging. The problem with these new kinds of threat is that their mitigation is often beyond the power of traditional leaders and economic interests still prevail in most cases.*
>
> Caroline Vieux, Coral Reef Management Officer, Secretariat of the Pacific Regional Environement Programme, in an email to the author, 16 May 2008

In looking at how different groups involved with climate change projects (and related IEK), the CEO of Tonga Trust reported that "*youth groups tend to be engaged in mangrove replanting and promotion of organic farming activities; women's groups are adapting to healthy diets (reviving traditional dishes and adding modern dishes), and promoting the economic and health benefits of local food vs imported food; local farmers are sharing knowledge about traditional farming practices – types of crops, best seasons, common pests and natural ways to control them*."

Community-Based Coral Reef Management, Foundation for the Peoples of the South Pacific International, presented at ITMEMS 2, Manila, March 24-27, 2003

[58] Reimaan National Planning Team. 2008. Reimaanlok: National Conservation Area Plan for the Marshall Islands 2007-2012. Published by: N. Baker: Melbourne.

Examples of traditional and innovative adaptation practices include[59]:

- Traditional farming techniques to protect watersheds and for crop diversification in order to minimize the risk of harvest failure (many varieties of crops with differing susceptibilities to droughts, floods, pest etc. are grown). Some of these varieties are adapted to different environment/field locations (near rivers, high on mountains, close to a primary forest etc). Changes of living area and a variety of movement patterns are used to deal with climatic variability;
- Change of hunting and gathering periods to adapt to changing animal migration and fruiting periods;
- Change of varieties and species. Livestock varieties may be changed to take account of new disease challenges;
- Changes in food storage methods, such as drying or smoking foods according to climate variability and corresponding availability of food;
- Changes in food habits, for example when the crops or cultivated plants are not producing good harvests, people will revert to gathering food in the forests. Or people who are close to a town might trade or barter with neighbouring villages or traders/markets. Some may even become dependent on international agencies (the World Food Programme, UN agencies etc);
- Forests as source of famine food in case of emergency;.
- Changes in environment (the habits/customs of planting crops and trees may no longer be related to the phases of the moon, low/high tides etc).
- Diversification of income-generating activities such as arts and crafts and tourism-related activities;
- Use of new materials and improved building technologies;
- Shoreline reinforcement;
- Rainwater harvesting and knowing alternative sources of clean water;
- Supplementary irrigation;
- Community-based disaster risk reduction.

In the section on Small Islands of the IPCC 4th Assessment Report, reducing vulnerability and increasing resilience to environmental change requires[60], *inter alia*:

- Education and enhanced public awareness;
- Human and financial resources to improve adaptive capacity;
- Appropriate technologies (e.g. renewable energy) and infrastructural development;
- Institutional strengthening.

While these strategies hold the potential to reduce vulnerability and increase resilience, they also act as barriers so long as they remain weak in development paradigms.

Section C: International Event

> "*An international event may well be very interesting but will it lead to improvements on the ground? There would have to be a purpose to the event that would allow for funding and capacity support to then become forthcoming to the communities in question, otherwise we risk an "exploitative" process. One issue to pursue would be the ability of international funds for climate change to specifically support elements of IEK in adaptation projects. I do not recall seeing this. It is mentioned as important in the guidelines for LDC NAPAs under the UNFCCC*."

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[59] Based on the findings in Macchi, M., Oviedo G., Gotheil S., Cross K., Boedhihartono A., Wolfangel C., Howell M., Indigenous and Traditional Peoples and Climate Change, Issues Paper, IUCN, March 2008

[60] Mimura, N., L. Nurse, R.F. McLean, J. Agard, L. Briguglio, P. Lefale, R. Payet and G. Sem, 2007: Small islands. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 687-716.

Mr. Espen Ronneberg, Climate Change Adviser, in an email dated 19 May 2008

A review of some of National Adaptation Programmes of Action (NAPA) for some of the countries[61] in the region reveal varying degrees to which IEK is incorporated in strategies. The Pacific Adaptation to Climate Change (PACC) Project, whose main objective is to *enhance the adaptive capacity and resilience of in Pacific Island Countries to the impacts of climate change*, is scheduled to have its regional inception meeting in 2008. There may be an opportunity to add or strengthen IEK as a component to country activities in food production and food security, coastal zone management and water resources management[62].

It is not clear from interviews conducted if one regional event or several subregional event would be the best way forward at this stage.

> *…a decentralized approach is very important and perhaps a two-tiered structure would be appropriate, whereby a regional conference could be held either before or after, country-by-country meetings. Maybe do the country-by-county meetings first and have folks come together afterward to share their outcomes and experiences. Maybe a larger meeting first would energise folks for country-based meetings. Not sure on which approach would be better*.
>
> Peter Urich, International Global Change Institute, in an email dated 19 May 2008

There was also no consensus as to where such an international event could be held or what might be the preferred timing but it may be worth considering adding a discussion on this at the Climate Change Roundtable being organized by SPREP and likely to be held in Samoa in late October 2008[63].

Almost all of those consulted in this survey saw value in holding an international event bringing together individuals to discuss the issues concerning IEK. Issues that could be discussed at an international event include[64]:

> *Right now "resilience to climate change" is a hot buzzword, but there are few concrete examples of what this really means, particularly from a human-dimensions or local marine management aspect. It would be great for different communities and agencies to be able to come together to share concrete examples and experiences to make what this means clearer to others who recognize its importance, but struggle with what can actually be done in this area*.
>
> Arielle Levine, Pacific Islands Fisheries Science Center (NOAA/University of Hawaii)

- *We could learn useful lessons from others and apply these successful stories to our situation.*
- *An event would enable sharing of information and resources to increase our resilience to natural disaster risks.*

> Alan Resture, Institute of Marine Resources, School of Marine Studies, Faculty of Islands and Oceans, The University of the South Pacific

> *An event could identify and explore the qualitative/causal elements of the inextricable link between biological and cultural diversity. This could then be used to strengthen arguments that the survival of humanity is dependent on ensuring the diversity of Indigenous local management/custodianship of their local resources.*
>
> Chris Jones Kavelin, Warawara, Macqaurie University
> Warawara Department of Indigenous Studies, Macquarie University, Australia

- *Dealing with water shortages and water surpluses/flooding in farming etc. How adaptable are traditional systems?*

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[61] Samoa, Kiribati, Vanuatu, Tuvalu. It is interesting to note that Samoa barely mentions Indigenous knowledge unlike the other three countries. This may reflect the degree of modernization in each country.

[62] Each of the 13 participating country's focal area by sector are: **Food Production and Food Security**: Solomon Islands, Fiji, Palau, Marshall Islands, Papua New Guinea; **Coastal Zone Management**: Cook Islands, Samoa, Vanuatu, FSM; **Water**: Nauru, Niue, Tuvalu, Tonga

[63] Interview with Espen Ronneberg, Climate Change Adviser, SPREP, 19 May 2008

[64] These suggestions and others can be found in Annex I

- *Awareness materials development: What do we want to communicate?*
- *Fisheries and coral reef bleaching: how do we adapt? Are traditional methods more appropriate?*
- *Practical methods and opportunities for communities: Tabu as traditional Pacific concept and required for resilience.*

Dr. Austin Bowden-Kerby, Counterpart International
P.O. Box 4649 Samabula Fiji, US Office is in Washington DC

- *Identifying the range of knowledge available and how these knowledge systems can be incorporated into contemporary management practices.*
- *Identify the main stakeholders and set target for action at local, national and regional levels.*

Joeli Veitayaki, University of the South Pacific
School of Marine Studies, USP, Suva, Fiji

- *Standardising and simplifying monitoring tools for community use.*
- *Funding opportunities.*
- *Networking and collaboration.*
- *Ways of recognising and acknowledging current community efforts.*

Tevi Obed Maltali, Foundation for the Peoples of the South Pacific
Vanuatu (FSP Vanuatu, Port Vila, Vanuatu

A synthesis of the issues identified by respondents suggests the following benefits of holding an event in the region gained from a greater understanding and sharing of IEK and its potential in building resilience to change:

- **Sharing lessons learned** in connection with coping with environmental change.
- **Collective response to environmental change**: A communal or collective response to crisis is a strong and common feature of Indigenous societies in the Pacific region. Learning about successful approaches to strengthen a sense of community and environmental stewardship will help build resilience throughout the region.
- **Food Security** (traditional land and marine livelihood activities): The extent to which Indigenous environmental knowledge relating to food security (agriculture, horticulture, knowledge of wild foods, inshore fisheries. Etc.) has been recorded and documented varies considerably within countries and across the region. Sharing what knowledge has been documented and how this record was made may serve to increase interest in research into Indigenous environmental knowledge and data collection for baseline and ongoing surveys.

  Traditional and sustainable land use and related management practices have maintained a rich natural environment for thousands of years. As in most tropical areas, traditional agriculture in Polynesia could be characterized as an advanced polyculture with annual crops mixed with a large number of shrub and tree species (also referred to as e.g. agroforestry, tree gardens, multicropping) (Kirch 1991) [65]. To regain some of this knowledge is to deepen our understanding of the natural world and our relationship and place in the matrix of biodiversity[66].
- **Water** is widely recognized as a critical global issue and access to clean water is currently of great concern to many PICTs. Vulnerability to inadequate water supplies have been exacerbated by direct impacts of climate change on rainwater and surface water (shifting rainfall patterns, drought), and on the quality of groundwater (saltwater intrusion). Because water is intrinsic to life, learning about and sharing Indigenous knowledge of water resources and traditional management practices will benefit communities throughout the region.

[65] A detailed analysis of this in a Samoan context can be found in Elmqvist, T., Indigenous institutions, resilience and failure of co-management of rain forest preserves in Samoa, retrieved 2 May 2008 from http://dlc.dlib.indiana.edu/archive/00000568/00/elmqvistt041300.pdf

[66] See Tavana, Namulauulu G.V., Traditional knowledge is the key to sustainable development in Samoa: examples of ecological, botanical and taxonomical knowledge, National Tropical Botanical Garden, Hawaii.

- **Health**: Sharing knowledge on human health and healing as practiced by traditional healers using natural, plant-based remedies and other health promoting agents found in nature, will be of increasing value to the region and the world at large although benefit sharing and legal mechanisms to safeguard Indigenous knowledge from bio-prospecting will require careful consideration. Interest in this area has grown markedly in recent years with such cases as the *mamala* tree fuelling the debate on gene patent issues, biotechnology and intellectual property rights[67].
- **Climate and weather forecasting**: In terms of predicting climate variability and change, Pacific Indigenous forecasting knowledge can complement Western scientific approaches to strengthen advance warning systems, improve forecast accuracy and enhance community preparedness with appropriate response strategies.
- **Prayer**: A discussion on Indigenous coping strategies would be incomplete without a reference to faith and the role of prayer. Indigenous people in the Pacific have a strong faith in God as creator, provider, and protector. Prayer is used by Indigenous people throughout the region and in many countries is a part of every day life. In a survey shortly after cyclones Val and Ofa, 19 farmers in Tafua, Samoa, were asked the question "What could you do to reduce the effects of another cyclone?" The three most frequent responses were: 1. Pray, 2. Diversify my crops, and 3. Work harder (Lindberg and Mossing 1996)[68]. Among the most common undertakings by Samoan village communities in their FVMPs include the need to offer prayers for a healthy marine environment[69]. Olaf, a category 5 tropical cyclone, seemed to veer away from Samoa at the eleventh hour and many people regarded their prayers as having saved Samoa.

From the responses received, an international event discussing issues concerning IEK would appeal to all the groups identified under section A.2 (Human Resources). Recognized Indigenous experts could present keynote addresses on different themes such as Indigenous perspectives on communal societies in a changing environment, food security (land and marine), health, water, and seasons. Such an event may be best organized with concurrent sessions (following the keynote presentations) and could involve, as both facilitators and participants, representatives from regional and international organizations, governments from the Pacific region, NGOs, community based organizations, lawyers specializing in the protection of Indigenous knowledge and cultural expressions, ethno-botanists, climate scientists and other researchers.

Section D: Conclusion

This scoping study assessing Indigenous environmental knowledge in the Pacific region was conducted in April and May 2008 and faced with a number of challenges. Using desk-based research and telephone interviews, it soon became clear that the holders of Indigenous environmental knowledge and those involved in this field are not easily accessible by telephone and/or electronic mail. Despite careful explanations concerning the cursory nature of the survey, there were a number of people who were unwilling to share any information on IEK and questioned the purpose of the study and who would be privy to the information.

Finding examples of Indigenous coping strategies in the Pacific region was also difficult given that much in the way of traditional knowledge systems has been lost.

Despite these difficulties, an overview of the key organizations and individuals in the Pacific region is presented in this report along with some of the impacts of climate change and how Indigenous people perceive and respond to these impacts. Some of the benefits to be accrued from an increased dialogue on IEK and environmental change are also listed and the idea of holding an international event discussed. Such an event would be received with interest and opportunities to discuss this may be included in two upcoming regional meetings on climate change issues being organized by SPREP to be held in the second half of 2008 – the Climate Change Roundtable and the Pacific Adaptation to Climate Change (PACC) Project Inception meeting.

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[67] Refer Pacific Genes and Life Patents, Pacific Indigenous Experiences & Analysis of the Commodification & Ownership of Life, edited by Aroha Te Pareake Mead and Steven Ratuva, published by Call of the Earth Llamado de la Tierra and The United Nations University Institute of Advanced Studies, 2007

[68] Cited in Elmqvist, T., Indigenous institutions, resilience and failure of co-management of rain forest preserves in Samoa

[69] Review of Village Fisheries Management Plan, of the Extension Programme in Samoa, SPC, 2001

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
CI **Counterpart International** Year est. Not known Status **NGO (international)** No. of staff Not known **Contact** **Dr. Austin Bowden-Kerby** P.O. Box 4649, Samabula, Fiji Tel +679 331 3377 Email bowdenkerby@connect.com.fj www.counterpart.org www.coralsforconservation.com	Poverty alleviation, environmental sustainability, good governance, empowerment community well-being and prosperity **Funding (medium-size grants)** AUSAID, USAID, MAcArthur and Packard Foundations, Shangri-La, etc	Marine and coastal resource management for climate change adaptation Restoration of temperature tolerant corals, proper construction of seawalls, Mangrove reforestation Carbon sequestration by reforestation	Establishment of no-take Marine Protected Areas Community awareness activities	Fulori Nainoca, Iliapi Tuwai, Mereoni mataika, all at PCDF USP, SOPAC, Ministries of Fisheries & Environment, Tourism ministry, UNEP, UNWTO
ISSUES FOR A REGIONAL EVENT	Dealing with water shortages and water surpluses/flooding in farming etc. How adaptible are traditional systems? Awareness materials development: What do we want to communicate? Fisheries and coral reef bleaching: how do we adapt? Are traditional methods more appropriate? Practical methods and opportunities for communities: Tabu as traditional Pacific concept and required for resilience			
DOE Department of Environment Year est. 2004 Status **Government (Niue)** No. of staff 8 **Contact** **Sauni Tongatule** Tel +683 4021 Fax +679 3312 298 Email tongatules@mail.gov.nu	To Manage Niue Natural resources **Funding** Very minimal funding from Government of Niue Major funding from Global Environment Facility	GEF Operational Focal Point: coordinate Climate Change GEF funded projects **Future climate change work** Pacific Adaptation to Climate Adaptation project (water resources)	**Other Work** Waste management, Conservation, Water management	GEF-SGP SPREP - PACC
ISSUES FOR A REGIONAL EVENT	Improvement of traditional crops to cope with climate change impacts on food security			

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
FSPI **Foundation for the Peoples of the South Pacific** Year est. 1965 Status **NGO (regional)** No. of staff 23 **Indigenous focus** **Contact** **Roshni Chand** Level 2, Office 2 Victoria Corner Building Tel +679 331 2250 Fax +679 3312 298 Email roshni.chand@fspi.org.fj http://www.fspi.org.fj/	We work with Pacific Communities through people-centred programmes to foster self-reliance within a changing world **Funding** Finnish Embassy, NZAID, IFAD		FSPI's community based disaster risk reduction and risk management programme recognises that due to climate change the frequency of natural hazards such as cyclones, floods etc will increase both in frequency and severity. Measures proposed in the project is for communities to identify their vulnerability and resources to minimize impact of mentioned disasters	UNDP, SOPAC, IFRC, member of Pacific Disaster Network
	Project communities are empowered to merge traditional and time proven practices with modern risk reduction measures in the three key areas (1) risk sensitive development i.e. appropriate proper land use planning, reforestation or ensuring appropriate cropping and water-use practices in drought-prone areas. (2) preparing in the event of a natural disaster - e.g. strengthening of homes using traditional knotting and other techniques; people centred early warning system, documentation of food preservation techniques etc (3) during a disaster - traditional methods of communication and options to seek in the event of worse case scenario and finally (4) after a disaster - rebuilding and ensuring the welfare of every member of the community.			
ISSUES FOR A REGIONAL EVENT	How to retain IEK in the respective countries			

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
FSPI **Foundation for the Peoples of the South Pacific** Year est. 1965 Status **NGO (regional)** No. of staff 23 **Indigenous focus** **Contact** **Etika Rupeni** Level 2, Office 2 Victoria Corner Building Tel +679 331 2250 Fax +679 3312 298 Email etika.rupeni@fspi.org.fj http://www.fspi.org.fj/	FSPI is a network of South Pacific island non-governmental organisations and overseas affiliates working in partnership across the South Pacific. The main function of the FSPI Secretariat is to coordinate the planning and design of regional development projects, based on the needs identified by the members and their constituencies. **Funding** FSPI is currently funded through some regional development funds from New Zealand Aid, some American foundations such as Mac Arthur and Packard Foundation, some government funding such EU, AusAid. Major funding: Some regional funding through SPREP, and French government **Future climate change work** Developing community-based climate adaptation management plans (tools) Developing community awareness programs	provide technical and capacity-building assistance to the network and other NGOs; provide sector-specific support in the areas of community health, community-based natural resource management, education and enterprise, with an underlying focus on good governance; promote dialogue and offer guidance and vision to the region; manage the network's regional programs; and liaise with regional organizations, governments, multilateral partners and donors.	Our communities and coasts program works with the communities to build community resilience through strengthening resource management capacity at community and national level. FSPI also developing a disaster management program to build on traditional knowledge and practices **Other Work** As a regional co-ordinating body, our major roles and responsibilities are to:	The FSPI Network is an independent group of like-minded NGOs who work at the grassroots level in nine Pacific countries. In addition, FSPI has three metropolitan partners: Australian Foundation of the Peoples of Asia and the Pacific (AFAP), Just World Partners (JWP) and Counterpart International, USA who offer a range of project services that extend beyond the Pacific. The community work undertaken by FSPI affiliates varies from country to country and from sector to sector. Community development remains the core business of our network, which includes various types of awareness programs and advocacy work. As a network, FSPI is committed to increasing stability and reducing poverty throughout the region. SPREP, Fisheries Division, Environment ministries USP, LMMA, UNDP

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
FSPV Foundation for the Peoples of the South Pacific Vanuatu Year est. Not known Status **NGO (regional/national)** No. of staff Not known **Contact Tevi Obed Maltali** PO Box 951, Port Vila, Vanuatu Tel +678 22915 Fax +678 24510 Email coralgarden@gmail.com P O Box 320, Luganville, Santo Tel: +678 37229 Email fspvan@vanuatu.com.vu **ISSUES FOR A REGIONAL EVENT** Regional Office: http://www.fspi.org.fj/	Support and promote the sustainable social, economic and environmental development of all people of Vanuatu Improve and promote the equal participation and fair treatment of all Vanuatu people, both within FSPV and outside, while conserving the unique cultural identities of Vanuatu **Funding** Major donors; MacArthur Foundation, ADB, AUSaid, Nzaid	Facilitate communities in formulating and implementing their resource management plans Management plans include MPAs, mangrove protection and replanting, coastline protection Empowering community governance system to enable them address new challenges as climate change	Empower communities on mental health issues and human health to tackle any health risk that climate may pose	FSPI Member of Vanuatu Association of NGOs (VANGO) Work in partnership with Vanuatu national institutions, Donors and NGOs
	T Standardising and simplifying monitoring tools for community use F opportunities2 Networking and collaboration Ways of recognising and acknowledging current community efforts			
IB Isle Botanica Year est. 1992 Satus **Private** No. of staff 1 **Contact Art Whistler** 2810 Kalawao St. Honolulu, HI 96822 Tel: 808 945-9334 Email whistler@hawaii.edu **ISSUES FOR A REGIONAL EVENT** http://www.islebotanica.com/	Research, along with consulting **Funding** Contracts from government and private companies	No direct connection to climate change	No indirect connection to climate change **Other Work** Writing books on plants and trees of the South Pacific	University of Hawaii (Adjunct Associate Professor at UH) USP in Fiji
	Loss of indigenous knowledge and plant names			

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
IGCI **The International Global Change Institute** Year est. 1997 Satus **University of Waikato** No. of staff 12+ **Indigenous focus** **Contact** **Janet F. Bornman** University of Waikato Private Bag 3105 Hamilton 3240 Tel: +647 858 5620 Mobile +64 27 57 56 355 Email JBornman@waikato.ac.nz http://www.waikato.ac.nz/igci/	IGCI serves as an Institute for coordinating and carrying out research and development projects on global environmental change issues -Provides post-graduate and professional training focused on cross-disciplinary issues of global environmental change -Promotes linkages to international research programmes, institutes, and funding organisations on matters relating to the human dimensions of global environmental change, biodiversity and sustainability -Engages in sustainability issues of local communities, including M_ori and Pacific Islanders and the Asian Pacific regions -Communicates the results of scientific research on global environmental change issues in order to facilitate policy, planning, and action in New Zealand, and its wider region **Funding** Foundation for Research, Science and Technology, FRST funding (government, large); regional and district councils (small)	Climate change activities include landuse change, water and food security, planning and governance and community development, biosecurity/biodiversity and flooding, mitigation issues, risk assessment, adaptation options and cost-benefits of adaptation. Development of post-graduate courses that convey the core strength within 'global environmental change' as well as in planning and governance. These post-graduate courses are also extended as professional training courses nationally and abroad. Vulnerability and adaptation assessment advising with countries in the Asia-Pacific region. **Future climate change work** Expand further issues of sustainability and food security; biodiversity and conservation issues in relation to threats by climate change factors and co-benefits that can be realised through adaptation to climate change; climate change policies for urban communities	Global change and natural hazards and how these either exacerbate or otherwise influence the outcome of climate change impacts	NZ regional and district councils, NZ and overseas universities; IGCI provides expertise through meeting participation and authorship of reports and publications to several international bodies including UNFCCC, IPCC, IGES, UNEP-EEAP, and UNEP-GEO. IGCI also has NGO status on a number of UN bodies. We also collaborate with CLIMsystems Ltd and Global Environmental Services of NZ to provide climate change vulnerability and adaptation assessment software and training across a number of Pacific island countries.

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
IGCI **The International Global Change Institute**				
OTHER COMMENTS	Historically (and indeed today) Maori people hold very strong views around climate (as opposed to Õclimate changeÕ) and broadly herein lies the basis for Maori peoples values around sustainability (social, environmental, cultural and indeed economic). The Maori language includes numerous words and phrases that define types and stages of climate and weather states. These words/phrases would often guide important times for economic (cropping, farming etc) activity, or food gathering like fishing and hunting as target species behaviour and activity would follow certain weather and climate events. Importantly this knowledge of climate and weather activities is intergenerational being transferred from generation to generation (often only orally). This is one important difference between how Maori think about climate compared to more western thinking around climate. Another important difference is how Maori think far more holistically about climate and its related impacts on activities eg currently the NZ Emission Trading System process including select committee sees Õsingle issueÕ interest groups (the farming lobby, the forestry lobby etc) representing their particular interests. Whereas Maori have multiple interests through having interests in farms, forests (exotic, indigenous), fishing etc and instead are having to rationalise and balance these far more holistic and multiple portfolio interests. Much more difficult to do but for Maori, a far more appropriate approach (than single issue approach). Maori have readily tuned into the climate change issue and debate principally because the underlying principle to attempting to address the effects of climate change are founded on the principles of sustainability (economic sustainability, social sustainability, cultural sustainability and, environmental sustainability). While Maori are actively interested and engaged in New ZealandÕs climate change program and policies evidenced by the fact the Maori have been by far the biggest single interest group to have written formal submissions and lodged these into the governments select committee process. However, as international research (Oxfam and others) has shown, it is the disadvantaged sections of an economy who will bear the most burden from macro policy development in response to climate change because; Maori are disproportionately represented in socio economic statistics meaning that Maori do not have the resources to bear the extra burden (increased costs) imposed by these policies. As well, Maori face institutional barriers that no Maori counterparts do by way of pieces of legislation like the Te Ture Whenua Maori Land Act that constrain Maori to readily take up any new opportunity that may arise out of climate change policies (shifting and changing landuse into higher and better use). Maori are however seriously interested and indeed engaged through government policy development to ensure fair and equitable treatment in terms of final New Zealand policy development on climate change. As well, Maori are rapidly developing international networks and alliances with other international indigenous peoples (Australia, North America et al) to discuss and co-ordinate global indigenous positions on climate change policy.			
ISSUES FOR A REGIONAL EVENT	Concentrating on co-benefits of adaptation to climate change and natural hazards for individuals (reduce taxes, other costs, build resilience) and businesses (including insurance and building companies); set up workshops for awareness and knowledge of climate change impacts			

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
LLEE **Live and Learn Environmental Education** Year est. 1992 Satus **NGO (Solomon Islands)** No. of staff 10 **Indigenous focus** **Contact** **Jacob Zikuli** P.Box 1454 Lombi Crescent St. Chinatown Honiara, Solomon Islands Tel: 23697 / 98607 Email livelearn@solomon.com.sb jacob.zikuli@livelearn.org	Develop and Implement projects and progrmas for teachers, schools, communities and other target groups in the field of environmental and development education Encourage individual and community attitudes, values and actions that are ethical and environmentally sustainable, share knowledge skills, learning experiences with others for the benefit of the physical and human environment, promote the integration of environmental, human, cultural and peace concepts in all education projects and programs	Not stated	Sustainable forestry programs, Sustainable development, Biodiversity Education, Population & Environment	Lauru Land conference of Tribal Community, Ministry of Forestry, environment and conservation, ECANSI, APHEDA, LLEE in the Pacific and ASIAN Region
METI **Matuaileoo Environment Trust Inc.** Year est. 2000 Satus **NGO (Samoa)** No. of staff 12 **Indigenous focus** **Contact** **Dr Walter Vermeulen** P O Box 1878, Apia, Samoa Tel: +685 21896 Email info@meti.ws	Environmental Protection and Conservation; Sustainable Development; Capacity building of grassroots communities for self-reliance **Funding** Government and International Donors Major funding: AusAID; NZAid; European Union; Pacific Development & Community Trust; Commonwealth Secretariat.	Projects to promote food and livelihood security **Future climate change work** Setting up a Permaculture Demonstration and Training Centre at METI's farm at Vailele	Coral Reef restoration (Coral Gardens construction and awareness raising about good reef management) **Other Work** National Coordinator of 'Second-Chance' Education (Adult Education; Life-long Learning)	Member organisation of the Asian Pacific Bureau of Adult Education (ASPBAE) USP Alafua; Ministries of Health; Education; Natural Resources & Environment; Women, Community and Social Development
ISSUES FOR A REGIONAL EVENT	How to blend IK with newer approaches such as Permaculture to increase subsistence security and resilience to the climate -food and oil crises			

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Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
MW **Manaaki Whenua** Landcare Research NZ Ltd Year est. 1992 Satus **Government (NZ)** No. of staff 380 **Contact** **Shawn Awatere** Private Bag 3127, Hamilton, NZ Tel: +64 078592790 awateres@landcareresearch.co.nz http://www.landcareresearch.co.nz/	To use science to understand and encourage sustainable development in AotearoaŠNew Zealand. Our work must combine ecological, social, cultural and economic components for policy and management systems to remain viable in the long term. **Funding** Foundation for Research, Science & Technology (50%). Other sources include central government, local government, private and business sector, universities, etc.	Research Understanding, mitigating and adapting to the impacts of climate change Development of knowledge, networks and strategies to embed mitigation and adaptation practices into regional and national economic and sustainable development initiatives. Development of new mitigation options, adaptation strategies to the effects of a changing climate **Future climate change work** Research into how to minimise potential risks resulting from global change to protect NZ's unique natural environment	Research to understand the processes that regulate emissions and removals of nitrous oxide and methane, including measurement and modelling, to develop novel mitigation technologies, and estimation of potential of efficacy of mitigation strategies.	Centre for Biodiversity and Biosecurity (CBB) Centre for Urban Ecosystem Sustainability (CUES) New Zealad Centre for Ecologocal Economics (NZCEE) Sustainable Land Use Research Initiative (SLURI)
MELA **Ministry of Environment, Lands and Agriculture Development** Year est. Not known Satus **Government (Kiribati)** No. of staff 20 **Indigenous focus** **Environment & Conservation Division** **Contact** **Riibeta Abeta** P.O Box 234, Bikenibeu, Tarawa, Kiribati Tel: +686 28 000, +686 28211 Email riibeta.ecd@melad.gov.ki riibetaa@yahoo.com www.melad.gov.ki **ISSUES FOR A REGIONAL EVENT**	Improving the quality and sustainability of the fragile atoll environment of the Republic of Kiribati through conservation and management. **Funding** Small grants: AusAID, NZAid, GEF-SGP, Large funding: AusAID, NZAid, GEF, and support from Australia, New Zealand and Taiwan	Adaptation activity planning and identification and prioritisation of coping strategies through a consultative process with representatives from outer islands **Future climate change work** Undertaking Second National Communication project for UNFCCC, and developing proposals for Adaptation projects	Assist in structuring project ideas for adaptation at government level, enable the mainstreaming path of local adaptation to match in relevant government sectors, enhance information flow for indigenous knowledge from community to government sectors	National (local NGOs and most island government ministries), regional (e.g., SPREP, SOPAC, USP, NIWA), sub-regional (e.g., Green peace, WWF); and international (through UNFCCC workshops, training, websites, eg CC:inet, etc.) Kiribati Adaptation Project, Renewable Energy Project
	Archiving and institutionalisation of indigenous knowledge at national and international level Issue of sharing those information among dispersed parties How to translate those indigenous ideas and knowledge into meaningful implementable projects			

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Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
MNZ **Met Service of New Zealand Ltd (MetService)** Year est. 1850 Satus Government (NZ) No. of staff **>200** **Contact** **Pene Lefale** 30 Salamanca Rd, Kelburn Wellington Tel: 027 5700 818 Email pene.lefale@metservice.com www.metservice.com	Weather services for public, aviation, and marine **Funding** Government, international commercial client	Weather and climate monitoring, data collection, data analysis, data management and quality control, communications, issuance of daily weather forecasts for public, aviation, marine, etc	Monitoring of weather and climate changes via observing networks, severe weather research, etc **Other Work** Weather systems research and modelling (e.g. THORPES project)	Other National Weather Services around the world (e.g Australian BOM, US NOAA, UK Met Office, WMO, IPCC, GCOS, etc) National Meteorological Services (NMSs), Crown Research Institutes (e.g. NIWA), Universities (meteorologist course with Victoria Univeristy of Wellington)
ISSUES FOR A REGIONAL EVENT	Networking of individuals and organisations working on indigenous knowledge, sharing of knowledge, establishment of joint projects,			
MQAFF/ CIRAD **Ministry of Quarantine, Agriculture, Forests and Fisheries** Year est. Not stated Satus Government (Vanuatu) No. of staff Not stated **Contact** **Vincent Lebot** P O Box 946, Port-Vila Valuatu Tel: +678 25947 Email lebot@vanuatu.com.vu www.agrobiodiversite.org	Research **Funding** FFEM/AFD	Breeding for adaptation Release of hybrids **Future climate change work** breeding root crops for adaptation	Genetic base broadening **Other Work** Research on food crops: root crops	VARTC MQAFF FFEM Agricultural Research for Developing Countries (CIRAD) French Global Environment Facility (FGEF) The Pacific Agricultural Plant Genetic Resources Network (PAPGREN)

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
NUS **National University of Samoa** Year est. 1984 Status **Government (Samoa)** No. of staff 200 **Indigenous focus** **Contact** **Fonoti Lafita'i Fuata'i** Address PO Box 1622, Apia, Samoa Tel: 60072 Extn 218 Email: l.fuatai@nus.edu.ws www.nus.edu.ws	Promote knowledge and understanding of Samoa and its people by according priority to Samoan Studies; Establish a centre of excellence in research and teaching in Samoan Studies **Funding** Major funder - Govt of Samoa. Seed funds from other organizations such as UNDP	Qualitative and quantative research conducted at a number of locations in Samoa, e.g. Influence of Soil & Climate Change on Biodiversity at A'opo, village land use patterns, monitoring water quality of natural springs at selected locations, and others. These are conducted as part of Samoa's contribution to the UN's MDGs - so these could be part of adaptation activity planning. **Future climate change work** Plans for a Marine Centre are in the pipeline; this will be the university's contribution towards marine and environmental studies in both lagoon and ocean locations for Samoa.	Comparative studies on health-related lifestyles (Samoan & Japanese children); curriculum development on food & textile technology; aspects contributing to poverty and/or prosperity in Samoan families; and others. These are also part of efforts to help alleviate problems of climate change, but in an indirect way. **Other Work** Staff of the Center are also involved in teaching at Baccalaureate and Postgrad levels.	NUS is the premier university institution providing tertiary education for Samoans and students from other countries including PNG, Tonga, Kiribati, Solomons, Vanuatu under programs such as the APTC initiative. We have links with other universities and institutions such as Gotland University (Sweden), UNESCO, Massey University (NZ), Auckland University (NZ), Victoria University (NZ), Otago University (NZ), University of Hawaii, University of the South Pacific, and many more. RDIS, SAWG, UNDP, MNRE, MESC, SUNGO, other Government ministries.
ISSUES FOR A REGIONAL EVENT	How significant is the contribution of small island states to the problem of green house gases? How can the problems of ocean poaching (especially marine resources) by other countries be solved for small island states? What progress is there so far regarding waste management practices by small island countries, and how significant is this contribution to alleviating the problems of climate change?			

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
PIFSC **Pacific Islands Fisheries Science Centre** Year est. 2003 No. of staff 194 (2006) **Contact** **Arielle Levine** **Indigenous focus project** Status **Government (USA)** Address 2570 Dole Street, Honolulu, HI 96822, USA. Tel: 808-983-5739 Email: arielle.levine@noaa.gov	To protect, restore, and manage the use of coastal and ocean resources through an ecosystem approach to management The Human Dimensions program at PIFSC focuses on human aspects of marine/fisheries management **Funding** US government	Current project on traditional marine use and management in American Samoa will determine what kind of traditional methods of adaptation and management people had in place in the past, although the focus of this work is not explicitly climate-change related (more traditional management and adaptation) **Future climate change work** Continued coral reef and human resilience work	Current work focuses largely on human dimensions of coral reefs, which are highly vulnerable to climate change, making human resiliency to these types of change an important aspect of our work **Other Work** Traditional knowledge and systems of marine use and management, socio-economic assessment and monitoring, quantitative and qualitative research involving human dimensions of coral reefs and Pacific fisheries	Part of NOAA's National Marine Fisheries Service (US government), with a cooperative agreement with the University of Hawaii through the Joint Institute for Marine and Atmospheric Research. We also work closely with US territorial marine management agencies. Currently working closely with American Samoa's Dept. of Marine and Widlife Resources (DMWR), National Park Service, Am. Samoa Office of Historic Preservation, also some collaboration with the Nature Conservancy and UH East-West Center
ISSUES FOR A REGIONAL EVENT	Right now "resilience to climate change" is a hot buzzword, but there are few concrete examples of what this really means, particularly from a human-dimensions or local marine management aspect. It would be great for different communities and agencies to be able to come together to share concrete examples and experiences to make what this means clearer to others who recognize its importance, but struggle with what can actually be done in this area.			

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
PIRISA **Pacific Islands Regional Integrated Risk and Assessment Program** Year est. 1999 No. of staff 4 **Contact** **Supin Wongbusarakum** **Indigenous focus** Status **Government (USA)** Address Research Program, East-West Center 1601 East-West Road, Rm 3030 Honolulu, HI 96822 Tel: +1(808) 944 7582 Email: wongbuss@eastwestcenter.org http://research.eastwestcenter.org/climate/risa/	Meet critical climate information needs in the Pacific Region through multidisciplinary climate research, assessment, education, and training; Provide integrated, locally relevant climate information to decision makers and communities in the Pacific Region; Enhance regional and local capabilities to manage climate risks, build resilience in key sectors, and support sustainable development; Promote collaboration among Pacific regional, US national, and international institutions and programs providing climate information products and services. **Funding** Mainly US Government via NOAA	All work of the Pacific RISA program is related to climate change activities. **Future climate change work** To do applied research on climate-related socioeconomic monitoring and indigenous and local knowledge on climate variabilities and extreme events. Purpose of these projects are to develop locally relevant adaptation strategies and improve resilience.	Networking and building partnership for climate-change activities in the Pacific region **Other Work** Socioeconomic monitoring of coastal communities in the Pacific Studies of indigenous sea nomadic peoples Local and traditional knowledge related to coastal and marine resource	Pacific El Ni–o Southern Oscillation (ENSO) Applications Center (PEAC); National Oceanic & Atmospheric Administration Integrated Data and Environmental Application (NOAA IDEA) Center; Social Science Research Program, University of Hawaii at Manoa, Honolulu; etc. US:NOAA Climate Program Office (CPO); The National Center of Atmospheric Research (NCAR); NOAA Coastal Service Center (CSC);

World Alliance of Mobile Indigenous Peoples (WAMIP); inter-governmental Panel for Climate Change (IPCC), World Climate Research Programme (WCRP), Global Earth Observation System of Systems, US Environmental Protection Agency, Research Triangle Park, NC; World Met. Organization (WMO)

International Sustainable Development Studies Institute, UNDP, UNESCO

Community Conservation Network

ISSUES FOR A REGIONAL EVENT

Can the knowledge be contributed to the the current scale of climate variability and change?

What is needed to integrate the knowledge into today's practices?
How can this knowledge be transferred intergenerationally or intra-societies?

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
SVC **Savaia Village Council** Year est. Not known No. of staff Not applicable **Contact** **Muliagatele I. Reti** **Indigenous focus** Status **Traditional Samoan village** Savaia Lefaga Samoa Tel +685 30637 Email: joereti@conservation.ws	To ensure peace and harmony in the village and to improve the standard of living for its people.for its people **Funding** UNDP-GEF Small Grants Program EU Micro-Projects	Village sea wall project helps protect coastal area from climate change related wave surges and erosion. Marine conservation project helps restore health of corals and coral reefs destroyed by previous cyclones in 1990 & 1991. **Future climate change work** Coastal management Food security	Climate change and climate variability affects food security. The village Talomua which is held every year ensures our village people will have adequate food at all times especially during drought and other natural disasters **Other Work** Environment, resource conservation and management	Working partnership with UNDP-GEF Small Grants Program, Fisheries Division of the Ministry of Agriculture & Fisheries, AusAID, NZAID and European Union all of whom provide technical and financial support for the village's conservation and other projects. UNDP, GEF, AusAID, NZAID, EU Ministry of Natural Resources & Environment
ISSUES FOR A REGIONAL EVENT	Building community capacity to adapt to climate change Understanding climate change at the community level Supporting climate change adaptation at the community level		Agriculture development and food security Women development	

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
SPREP **Secretariat of the Pacific Environment Programme** Year est. 1982 No. of staff 64 (2007) Status **CROP Agency (regional)** **Contact** **Tepa R Suaesi** P.O.Box 240, Apia. Samoa Tel +685 21 929 Mobile +685 7789659 URL www.sprep.org Email tepas@sprep.org	Promote cooperation in the Pacific islands region and to provide assistance in order to protect and improve the environment and to ensure sustainable development for present and future generations **Funding (medium-size grants)** SPREP Members' fees provide core budget support. Additional frunding from governmental and inter-governmental donor agencies such as AUSAID, NZAID, JICA and GEF	SPREP has a climate change programme, which includes activities on adaptation and building resilience to the impacts of climate change. **Future climate change work plans** Refer to SPREP's Strategic Programme 2004-2013 and Action Plan 2005-2009 **Pacific Adaptation to Climate Change Project**	SPREP mobilizes technical expert and consultancy assistance to assist countries in the various fields of climate change adaptations, mitigation and resilience building. **Other Work** Environment monitoring, assessment and reporting	SPREP is an inter-government organisation governed by 20 member countries and territories of the Pacific region that include France, USA, NZ and Australia. It works collaboratively with other inter-governmental organisations on environment & development programmes of the Pacific region.

OTHER COMMENTS

People in the region generally regard climate change as real with severe impacts that destroy their fragile environments and deeply constraining their sources of food, water, energy and well being, and that both their traditional and modern systems of knowledge are required to effectively adapt and cope with this environmental change.

The region uses locally available means and heavily accesses assistance from families abroad and donor agencies for their efforts to secure food, water, energy and better shelter in the face of increasing bad weather and climate variation.

While there are some instances of different approaches used by different groups (e.g. elders, youth, women, men) grassroots communal societies generally lean towards collective approaches to solve environmental change issues.

ISSUES FOR A REGIONAL EVENT	
	Adapting traditional local governance systems to cope with the challenges of changing environment and development needs today The ethical dimension of climate change - indigenous peoples rights and responsibilities for building a sound and sustainable global society

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
USP **University of the South Pacific** Year est. 1968 No. of staff Not known **Contact** **Joeli Veitayaki** School of Marine Studies Faculty of Islands and Oceans Private Mail Bag, Suva Fiji Tel +679 323 2940 Mobile +679 9252095 Email resture_a@usp.ac.fj	Education and training of Pacific Islanders **Funding** Small funding for grassroot International Ocean Institute	Written and published some papers and work with communities on adaptation and mitigation. Use of traditional knowledge can enhace adaptation and mitigation **Future climate change work plans** Empowerment of communities to use traditional knowledge better and involve Governments and Donors to understand local communities	Work with local communities in Gau Island, Fiji **Other Work** Teaching and Consulting	Attended some UNESCO conferences and the IUCN World Parks's Congress International Ocean Institute-Pacific Islands Frontier-Fiji, International Ocean Institute, WWF, Conservation International
ISSUES FOR A REGIONAL EVENT	The range of knowledge available and how these knowledge can be incoporated into contemporary management. Identify the main stakeholders and set target for action at local, national and regional levels			
Contact **Alan Resture** School of Marine Studies Faculty of Islands and Oceans Private Mail Bag, Suva Fiji Tel +679 323 2940 Mobile +679 9252095 Email resture_a@usp.ac.fj www.usp.ac.fj www.usp.ac.fj/index.php?id=imr http://www.usp.ac.fj/index.php?id=5585	Consultancy and research, specialising in the marine resources of the Pacific Islands Region Forge collaborative links with other international and regional organisations **Funding (medium-size grants)** AUSAID, USAID, MAcArthur and Packard Foundations, Shangri-La, etc	Coordinates the Coral Reef Monitoring Network South-West Pacific Node. **Future climate change work plans** Continue to work on climate change issues related to Tuvalu and atoll nations in the Pacific Implement recommendations I put forward in my recent paper on Utilising indigineous knowledge to reduce natural disaster risks	Research on utilising indigineous knowledge to reduce natural disaster risks. **Other Work** Coordinates overseas university courses on tropical marine environment Turtle conservation work in Fiji, Vanuatu and Tuvalu Environmental consultancies for World Bank (GEF)	SPREP, FSPI, WWF, Tuvalu Association of NGOs (TANGO) Government of Tuvalu, Government of Fiji, Dept of Fisheries, Dept of Environment
ISSUES FOR A REGIONAL EVENT	We could learn useful lessons from such an event from others and then apply these successful stories to our situation Ability to share information and resources as to increase our resilience to natural disaster risks			

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
TCDT **Tonga Community Development Trust** Year est. 1978 No. of staff 13 Status **NGO (Tonga)** **Contact** **Sione Lanivia Fakaõsi** P O Box 519, Havelu, Tonga Tel +676 21494 or 64876 URL www.tcdt.to Email s.fakaosi@tcdt.to **OTHER COMMENTS** People and land (environment) were believed in traditional Tongan society to be in unison. Culture, traditional knowledge and values developed over the years from this unique relationship. However, recently, the rate of environmental change has not only been so fast but has occurred at a much larger global scale that it takes time for people to comprehend and understand. In recent times, most people perceived environment/climate change, especially the obvious rise of sea level in many parts of Tonga, as the unintended results of ignorance and poor development initiatives. In the past 100 years, development initiatives were very much focused on increasing productivity and gaining economic growth with little consideration to its impacts on the environment. Linking to international markets through exportation of copra, banana and more recently with squash pumpkins has brought about limited benefits and more problems, such as, using of DDT (POP) as agricultural chemical and it has threatened water quality There is also some general belief that climate change is associated with a number of other factors, like not having enough land for agriculture while population constantly increase, urbanisation which leads to destruction of mangrove forests for settlement, firewood, over exploitation of marine resources such as fish to feed population in urban centres, commercial farming which destroys forest trees without replanting initiatives, and basically, the lack of understanding of the consequences of their actions on the environment.	To improve health, environment and living standards of poor communities in Tonga through effective partnerships with government and other development agencies. **Funding** Funding of Tonga Trust activities comes from fund raising targeting available funding windows from local government and international funding agencies **Major Funding Support** NZAid through FSPI, AusAID, GEF-SGP, Birdlife International through Fiji Environment Consultants, EU through Government of Tonga, SOPAC, SPC, Canada Fund, Christian World Service	One of Tonga Trust longest serving programs, Amatakiloa Fefine Tonga (Women Village Development) participated on awareness and tree planting activities (mangroves, fruit, traditional and medicinal) **Future climate change work** Improve community good governance, raise awareness of communities on the causes and impacts of climate change and develop community action plan to address priority issues Encourage communities and schools to participate on tree planting (mangrove) scheme to control soil erosion and to address deforestation Renewable energy - raise community awareness on sustainable use of firewood and seek cheap alternative sources of energy for home use for cooking and lighting	Tonga Trust has recently secured project funds under the GEF SGP for an integrated approach to address biodiversity and climate change issues in Haapai island group **Other Work** Improving good governance at community level and linking communities with policy makers and development partners - empower and setting up of village councils Raising awareness on mental health issues and developing coping strategies Empowering women - skills transfer, environmental protection and conservation, training on water, health and sanitation Identifying important areas for bird conservation Raising awareness on disaster preparedness and setting up of village-based mechanisms for immediate responsive action Promotion of proper community-based waste management, recycling and re-use.	Tonga Trust is a member agency of the Foundation of the People of the South Pacific International (FSPI) based in Suva, Fiji. FSPI has member agencies in Australia, East Timor, Fiji, Kiribati, Papua New Guinea, Solmon Islands, Tonga, Tuvalu, UK, USA, Vanuatu and Samoa. Government of Tonga: mediation, reconciliation and civic education FSPI: good governance, youth and mental health, disaster preparedness SOPAC: water, sanitation and hygiene SPC: women in development capacity building Oxfam NZ: organic farming USP: leadership network US Peace Corp: Capacity building Promotion of sustainable agriculture & organic farming

Annex I: Key Organizations

Organization / Contact Person	Aims of Organization / Funding	Connection of work to climate change (Direct)	Connections to Climate Change (indirect)	Partner organization contacts
TCDT **Tonga Community Development Trust continued**				
ISSUES FOR A REGIONAL EVENT	Encourage documentation and preservation of local/traditional knowledge Encourage copyright of traditional knowledge Encourage sharing of traditional knowledge and best practises - local solutions for global issues Increase the value of traditional knowledge in comparison to modern scientific knowledge			