

Water is Life: Governance, Policy and Local Responsibility in Pacific Case Studies 2008–2010.

Winston Churchill Fellowship

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Introduction – Key Themes

A purpose of this study of water in selected Pacific countries is to identify forms of decision-making and management that are beneficial to communities and to waterways and their ecosystems. An approach considered is an ethics of responsibility in the management of water. Responsibility is to meet the challenges of climate change impacts on water and to focus on collective guardianship of water, water ecosystems and resources associated with water.

The report is based on site visits, with funds contributed by a Winston Churchill Fellowship. The countries visited for the study were Fiji, Vanuatu, Samoa, and Hawaii. The report includes references to water issues in Aotearoa New Zealand and brief reference to Australian research on an ethics of responsibility for policy development and collaborative management of water and environmental resources. The interests of this study are in responsibility for water ecosystems and in policies and practices in favour of enhancement of water ecosystems, of sustainability in water use, and in forms of governance in which development is calibrated to ecosystem health.

Indigenous interests in water are significant to the Pacific context across both developing and developed countries. Aotearoa-New Zealand and Hawaii have similar historical influences of strong imperatives for economic development associated with their positioning within the OECD.



Indigenous interests are also shared in Hawaii and Aotearoa-New Zealand with Native Hawaiian and Maori world views having to be articulated in contexts where the traditions of liberalism are now dominant. For this paper liberalism refers to western forms of politics and economies based on private individualized property rights, competition and resource exploitation for profit. Liberalism of course consists of many strands, and in respect of environmental resources and water spans a wide spectrum from conservation priorities to ownership rights and extremes of resource exploitation with globalized interests of economic development. Conservation and environmental lobbies may be at loggerheads with commercial imperatives, and this is another tension and source of conflict in around access to and management of water .

The other countries included in the study are classified as ‘developing’ countries, and while indigenous systems are the norm, they all have development imperatives which are putting pressures on water use and supply, and bringing increased interplay between traditional forms of governance, governance for sustainability as a form of accommodation between traditional and development in resource use, and governance to meet the globalized agendas of trade and economic development.

Accounts of water management are full of references to conflict between the many interested parties. Some of the conflicts are around more collective and long term inter-generational interests of indigenous peoples and those with strong environmental priorities, and between commercial privatized interests.

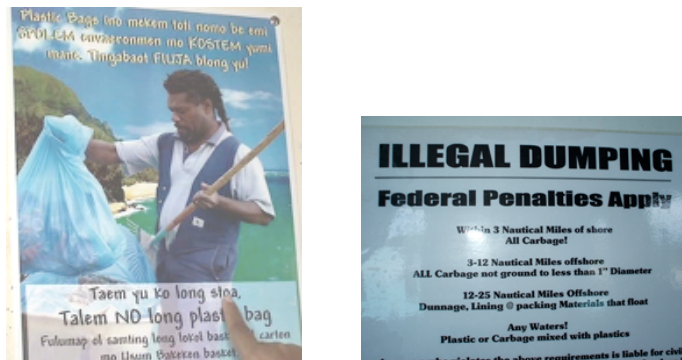
One of the main challenges to decision-making in Pacific countries, including New Zealand, is that **customary land ownership and tribal authority over resources do not correspond with the introduced system of private property** ownership which has become embedded as a basis for economic development along with **systems of centralized government**.

It is not my intention to polarize indigenous interests with those of development. It is possible to reach an accord between assuring the integrity of water ecosystems and use of water. The example of Emua village in Vanuatu shows a community reaching agreements with a local gravel industry, developing waste management strategies and managing fresh and marine water for improved fisheries and tourism. In Fiji, one of many villages in the Local Management of Marine Areas Network has developed a reciprocally beneficial working relationship with a hotel complex with agreements for fresh water, marine biodiversity and fisheries management. The accord between Tainui Māori and the Crown is a beacon of hope and experiment for co-governance of the Waikato River in Aotearoa-New Zealand.

The concept of healthy ecosystems encompass a holistic understanding, including the **traditional concept of water as the source of life**. Recognition of the fundamental life-giving properties of water are invoked in the Hawaiian saying ‘water is Life and Kāne is the keeper of water’ (Sproat 2009:3). Kāne is the one of the Hawaiian four principal deities, and this reference to Kāne suggests the understanding of the spirituality within

all material and life-forms throughout Pacific cultures. The life-giving properties of water need to be safeguarded, and water quality may be indicated by reference to the health of water. In a time of mounting attention to water quality, to the commercial value of water and to the commodification of water as a scarce resource, water policy development is crucial.

The decline in the state of waterways and of water resources such as fisheries is a sign of the effects of land use on water. Water pollution from sewage and waste discharges as well as water abstraction for industrial use and for irrigation for agriculture all contribute to deteriorating water quality.



Signs to stop dumping of waste including plastics, in Vanuatu and Samoa

These issues are well documented in New Zealand, most recently in the Land and Water Forum Report (2010), and are at the heart of the critical loss of the integrity of rivers in Hawaii, as documented in *Olaka Wai* (Sproat, 2009).

The health of water is closely related to the health of people and to economic sustainability.

How a country manages its water resources determines the health of its people, the success of its economy, the sustainability of its natural environment, and its relations with its neighbours (Iza and Stein 2009).

Responsibility being taken by women was evident in Women's Committees in villages such as Falalima, Samoa and Emua, Vanuatu (where women were on the environmental committees) to project management roles for the government's Integrated Water Catchment demonstration project in Vanuatu. Similar leadership from women in responding to major challenges to restore water flows to depleted and degraded waterways are powerfully demonstrated in Hawaii, where Kapua Sproat is sustaining a legal challenge based on the concept of water as a Public Trust.

The contextual discussion which follows is drawn from sites visited which included:

- Village watersheds and coastal management in Fiji and Vanuatu
- Village water supply in Samoa and Vanuatu

- Legal and Governance instruments for water supply and recovery of water ways in Samoa and Hawaii

The study includes reference to Indigenous knowledge in governance systems for water in Fiji, Vanuatu, Hawaii, Samoa where this was made available.

As a snapshot, it provides insights into local decision making on water and on more centralized level instruments of policy and law to address a range of issues including household water supply in Samoa, village management in Vanuatu and Fiji and restoration of rivers and their flows in Hawai'i. This is not a comprehensive account of water issues, water policy, science, or of any specific country context.

A Snapshot of Current Jurisdictions

Despite the inter-related nature of the hydrological cycle, most **policy level frameworks impose separations in order to define areas of jurisdiction and responsibility**. For example, a general rule in Pacific water governance is that marine water is under separate jurisdiction from fresh water.

The Water Policy Framework in Samoa

In Samoa, water management is a collaboration between **three ministries** (Finance, Environment, and Health) and the **Samoa Water Authority** (SWA). These bodies are responsible for rural water supply, improvement in sanitation, and water monitoring.

Policy Focus

The **National Water Resources Policy** (NWRP) provides a framework for the management, conservation, and sustainable use of Samoa's water resources. There was broad consultation among stakeholders during the formulation of the NWRP. It focuses on the management of water resources rather than the supply of water.

Issues and Challenges for Samoa

The Ministry of Agriculture, Forestry, Fisheries, and Meteorology is responsible for watershed management and hydrology, whereas the Health Department monitors standards. **No agency is formally responsible for the overall regulation of water resources.**

Despite major concerns over the conservation of limited water sources, there are **no effective means of protecting water catchments within customary lands**. For example, no control mechanisms are placed on the free extraction of water from boreholes for the commercial bottling of spring water.

The challenges facing Samoa can be summarised as:

- poor water quality
- excessive demand on water supply

- fragmented control, management, and protection of water resources
- competing and conflicting demands for water resources by both consumptive and non-consumptive users
- insufficient knowledge and understanding of water resources
- lack of community understanding and appreciation of responsible water management
- lack of attention to the social and environmental impacts of development proposals, particularly abstractions.

The Water Policy Framework in Hawaii

In Hawaii, the Water Commission, with overall authority to regulate fresh water, **divides water management into surface water and ground (artesian) water.**

Policy Focus

Under Article XI, Section 7, of the **State Constitution**, ‘The legislature shall provide for a water resources agency which, as provided by law, shall:

- set overall water conservation, quality and use policies
- define beneficial and reasonable uses
- protect ground and surface water resources, watersheds and natural stream environments
- establish criteria for water use priorities while assuring appurtenant rights and existing correlative and riparian uses and establish procedures for regulating all uses of Hawaii's water resources.’

Thus, the idea for the State of Hawaii's **Commission on Water Resource Management** emerged. However, the Commission was not established until 1987 when the Hawaii State Legislature enacted the State Water Code.

Issues and Challenges for Hawaii

A major issue in Hawaii is the **restoration of waters previously diverted for mass-scale agriculture**, especially to one-time sugar plantations. Closely associated with this priority is the careful research and litigation in pursuit of **constitutional redress through the public trust doctrine**, which is enshrined in Hawaii’s State Constitution.

The Water Policy Framework in Vanuatu

In Vanuatu, the Environmental Management and Conservation Act 2002 and the Water Resources Management Act 2002 provide for the sustainable use of natural resources and the protection and management of watersheds.

Policy Focus

The Government believes that raising the welfare of Vanuatu’s people will be achieved through:

- increasing **sustainable economic growth** to create jobs and raise incomes while **conserving resources** for future generations
- ensuring macroeconomic stability to create a **calm investment climate**
- **raising standards of service delivery**, particularly to rural and outer regions, to improve access to basic health and primary education services while **lowering the costs of internal trade**.

Five areas for targeted action are:

- management
- capacity building, including institutional strengthening
- awareness and education
- research-based decision-making
- investment.

Issues and Challenges for Vanuatu

The **Integrated Water Resource Management (IWRM) project** in Vanuatu aims for ecologically sustainable development, especially through the protection and management of water supply.

A weakness in Vanuatu is that **laws are specific to a particular resource**. A lack of coordination produces legal and administrative overlaps, gaps, and sometimes conflicts. Areas of conflict for environmental protection are more prominent where environmental policies do not harmonise with current trade, commercial development, and investment policies of the national government, Local Government Councils (LGCs), and municipal councils.

The Water Policy Framework in Fiji

Fiji's Water policy clearly states the Government's **goals** for water resources in Fiji. It also provides the **principles** by which water resources should be managed in Fiji and sets out the major **steps** towards creating an effective regime for managing water resources.

Policy Focus

Fijian policy has been developed in recognition of the **increasing threats and competing demands** for the water resources of the Fiji Islands.

This policy covers all freshwater resources of Fiji, both surface water and groundwater, and acknowledges that freshwater can affect the quality of coastal and marine waters.

The policy states goals and principles to guide water management in Fiji, and it identifies the most important elements of water reform to be considered in the next two years.

The following goals guide the management and use of the nation's water resources.

- To achieve water supply and sanitation service objectives that are consistent with the **Pacific Regional Action Plan on Sustainable Water Management**
- To ensure the sustainability of water by managing it as a **renewable but finite** resource
- To ensure water use is as **efficient as possible** and that **wastefulness is minimised**
- To **allocate water to all types of use** as effectively as possible with the minimum of conflict between water users
- To facilitate access to water for the promotion of **economic development**
- To maintain the **quality of water** in water bodies for beneficial uses and the environment
- To **protect water bodies from physical damage** that will harm the quantity or quality of their water
- To **lessen the impacts of extreme events**, such as flood and drought, by applying appropriate plans and measures
- To ensure that freshwater outflows into coastal waters do **not cause unnecessary harm to coastal and marine ecosystems**.

Issues and Challenges for Fiji

In future, the pressures on water resources in Fiji will increase in two ways.

- Larger volumes of water will be demanded for **water supply** and **sewerage**.
- Growth in industrial, energy, mining and other **commercial developments**.

Water Management in Samoa

In Samoa, **82% of land is in customary tenure**.

An ambitious European Union funded water-reform programme involves sector-wide collaboration and capacity building, the rehabilitation of 17 rural water supplies, improvements to sanitation and water supplies to 200 schools and 15 hospitals, and the re-establishment of the hydrological and groundwater monitoring networks.

The SWA is installing the infrastructure for piped water supply to villages. It has also introduced allocations within set limits for sustainable flows, environmental flows, and water quality standards.

A User Pays System

There is concern at the user-pays aspect of the water supply system. Challenges for the Samoa Water Authority include both the cost of the infrastructure and the ongoing costs. A public/private partnership is one proposal.

In communities with subsistence economies and therefore very little income, payment for water can be a challenge. During 2009, a notice on the Samoan Water Authority website warned that water would be cut off to villages that had not paid their water fees.

The Samoa Water Authority (SWA) water supply does not reach Falelima village and therefore the Falalima Village Council and Women's Committee determined that a rain water harvesting system is the most viable for the village. Falelima is a remote village where ground water has become saline, possible due to sea level rise, and fresh water springs are below the tide level (Tupu 2010). The village consider rainwater collection provides essential water, and does not require ongoing costs. They would be wary of being connected to the SWA system if it is extended to their village because of costs and access for maintenance.



A water collection system was installed at the Falelima school through a partnership with a New Zealand Rotary Club. Water collection for fale (houses) subsequently began as a development project, with the support of the RESPONSE trust. Funds to begin water collection for houses were provided through the New Zealand KOHA-PICD scheme, which is no longer in operation.

It is estimated that the Sili river could provide water for all of Savaii. The SWA is interested in building a dam on the river for hydroelectric power, and to this effect have been negotiating with the village council for thirty years. They have had backing and technical assistance from international aid agencies and the Asia Development Bank.



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The villagers themselves are the guardians of the resource, and the village council is mandated to represent the village. The council has not agreed to the proposed scheme. The government and the village of Sili have been unable to reach agreement on the involvement of the SWA in managing the water resource. The village fully agrees to provide water for the whole of Savaii, but will not agree to any charges except to commercial users.

Sili village initiated The Palauli le Falefa Water Reticulation Project from which the Sili river contributes pristine, fresh water to five neighbouring villages. Water is seen as a public good that should be delivered free to all homes. Attempts by some to privatise water in Samoa were contrary to the principle of public goods. The project's success has fortified villagers' rejection of user pays and privatisation.

The Sili case study shows that adequate prior consultation with villagers is essential to smooth project implementation. Consultation ensures better informed and empowered local governance, resulting local people's direct and on-going contribution to the success of major projects.

This project also demonstrates an essential contrast between what was explained as 'passive recipient' projects that give 'aid solutions' and 'hand outs' to targeted beneficiaries. Although the project is not self-funding (relying as it does on donated aid), the village worked with a local conservation organisation to ensure delivery of water as a public good to the villages involved.

Water Management in Hawai'i

Modern-day Hawai'i

Although Hawaii has the status of a developed country, the indigenous populations share regional identity as peoples of Moana-Nui-a-Kiwa. Hawaii is an especially interesting case study because of the intensive development that has taken place there.

Traditional Philosophy and Modern Practice

Indigenous Hawaiian groups are now litigating for the recovery of water rights protected in the constitution. Their cause derives from Hawaiian traditions and the Constitutional status of water as a Public Trust. The fact that trusteeship is a constitutional concept allows campaigners to seek redress in law.

In *Ola Kai Wai*, the spiritual and traditional aspects of water guide modern-day Hawaiians in using the law to reinstate trusteeship over water. Traditionally water is a physical manifestation of Akua Kāne, who also carries the authority of trusteeship over water for communal benefit. Akua Kāne is one of the four ali'i nui (principal ancestral gods) that are recognised throughout Polynesia. Together with Akua Kanaloa, the principal god of the ocean, Akua Kāne brought springs and streams forth from the earth. In this conception, water belonged to the deity Kane-i-ka-wai-ola for the benefit of the

people and the land. 'The ali'i nui, in old Hawaiian thinking and practice, did not exercise personal dominion, but channelled dominion.' (Sproat 2009:5) In other words, Kāne was a trustee.

This spiritual association meant that water could not be commodified or reduced to physical ownership.

In ancient times, water was a public trust resource, which means that no-one – not even ali'i – could own water. Instead, water was a resource managed for present and future generations. (Sproat 2009:4)

With foreign settlement came the commercialisation of resources. Two divergent traditions have thus created a chasm between public good interests and commercial, privatised interests. The chasm is experienced in rivers that have been deprived of their flows by commercial users and no longer support traditional agriculture. The fact that trusteeship is a constitutional concept allows campaigners for water as a public good to seek redress in law.

Hawaii's constitution was amended in 1978. A new framework for water management was shaped. Article XI provides that all public resources be held in trust by the state for the benefit of its people. A specific provision for water is 'to protect, control, and regulate the use of Hawaii's water resources for the benefit of its people'.

Water Designations

Integrated management was to be achieved in Hawaii through designations. Both underground and surface water could be designated for integrated management. It was envisaged that all of Hawaii would come under designation. Designations are hotly contested, and inadequate resources are limiting the Commission's ability to apply designations. Delayed designations support the continued abstraction of water for commercial purposes.

Environmental Flow Standards

'Environmental flows' are defined as the amount of water needed to maintain rivers and their functions, which include uses that benefit local people.

Environmental flow is the water regime provided within a river, wetland or coastal zone to maintain ecosystems and their benefits where there are competing water uses and where flows are regulated. Environmental flows provide critical contributions to river health, economic development and poverty alleviation. They ensure the continued availability of the many benefits that healthy river and ground water systems bring to society (Dyson et al 2003:6)

Standards for environmental flows are context and country specific. In Hawaii Environmental Flow Standards are being used to ensure customary rights are adequately considered against all the other competing interests.

Na Wai `Eha

In central Maui, the water from a system of freshwater streams known as Na Wai `Eha or 'The Four Great Waters' has been diverted for more than a century to irrigate sugar plantations, even after the decline of the sugar industry. Now, a proposed decision by the Water Commissioner of Hawaii would restore 34.5 million gallons a day to Na Wai `Eha, which constitutes about half of the diverted flows.

The proposed decision is the first step by the Water Commission to resolve a legal battle dating back to 2004, when Maui community groups petitioned the commission to restore the streams. The major water diverter is a former sugar company-turned-water company, which now turns a profit by selling water to private development projects.

Wailuku Water Company's attempted water profiteering is an affront to the principle, enshrined in the Hawai'i Constitution and affirmed by the Hawai'i Supreme Court, that water is a public trust resource that belongs to all.
(Earthjustice Attorney Isaac Moriwake 2010)

Earthjustice petitioned the state Commission on Water Resource Management to establish in-stream flow standards that would sustain beneficial uses, such as ecological protection, , recreation, and scenic values and Native Hawaiian practices. Lack of water flows threatens Native Hawaiian taro farmers' long-held rights to fresh water for their taro patches. The petition demanded that the water currently being hoarded and wasted by private companies be returned to the streams of origin.

In June 2010 the State Commission on Water Resource Management ordered the Wailuku Water Co. to restore water to the Waihee river. Wailuku Water Co. diverts the stream for users including Hawaiian Commercial & Sugar Co. The order required the company to return 12.5 million gallons per day to two of the four streams that make up Na Wai Eha.



Water flow returning to Waihee River, August 2010. (<http://www.mauinews.com/page/content.detail/id/534265.html>)

In-stream flow standards

In-stream flows are a crucial tool for protecting the public interest. Interim standards have been used to amend the diversion of 27 streams for sugarcane irrigation in East Maui.

It is the State Water Commission's responsibility to designate in-stream flows as early as possible, especially before authorising off-stream diversions that might be detrimental to in-stream uses and the public good.

In Hawai'i, interim in-stream flow standards are the principal implement for permanently protecting the public interest. Such standards ensure that enough water flows into streams to support beneficial in-stream and off-stream uses. Beneficial public uses include fishing, hunting, recreation, sightseeing, and other activities.

It was expected that interim in-stream flow standards, would provide benchmarks that represented the flow levels required to support fish and other aquatic life. It was also expected that there would be reference to pre-diversion flow levels and to the ecosystems that had been supported by these natural levels.

To date, the only interim in-stream flows have been set through litigation based on the public trust doctrine. These have been used to amend the diversion of 27 streams for sugarcane irrigation in East Maui.

It is the State Water Commission's role to apply designations and in-stream flow standards, and a petition is the means to activate this process. 'When any interested person files a petition, the commission is required to respond expeditiously.' (Sproat: 23) It is the Commission's responsibility to designate in-stream flows as early as possible, especially before authorising off-stream diversions that might be detrimental to in-stream uses and the public good. Filing a petition is a rigorous process involving the provision of biological, hydrological, and cultural data about the need to protect and conserve beneficial stream uses.

The Waiāhole Case Study

The Waiāhole Ditch system on O'ahu demonstrates how a petition and associated litigation has been used to implement the public trust doctrine.

The Waiāhole Ditch system carried 27 million gallons of water a day from Kahana, a windward community, through the Ko'olau mountains to Kahalu'u on the central plain. In 1993, areas surrounding the Waiāhole Ditch were designated as groundwater management areas. O'ahu Sugar then announced it would close. A coalition of public-interest lawyers (working for Earth Justice and the Native Hawaiian Legal Corporation) filed a petition requesting that all water diverted by the ditch system be returned to the windward streams to support the growing of traditional crops, especially kalo. At the same time, about 20 other parties were seeking water permits for large-scale industrial agriculture. Through a series of contested hearings, the Commission continued to

allocate part of the water to each of the parties, both windward and leeward. These decisions have been appealed in the Hawaii Supreme Court. (25)

The long process of litigation, decision, and appeal is serving to affirm the public trust doctrine in Hawaiian law. The process also clarifies the status of Hawaiian Homeland Reservations as entities that should be protected under public trust.

Water Management in Vanuatu

Coastal Resources and Local Governance

In Vanuatu, customary land tenure gives weight to village authority over water management, including marine resources. Vanuatu offers an example of innovation in integrated management, set in a context of customary ownership. In Vanuatu, village communities own all land and resources from their village boundaries on land to the seaward side of any reefs. This is enshrined in the Constitution. The deep sea area beyond the reefs is owned by the state.

Coastal resources remain crucial to the livelihood of Vanuatu's human population. Nonetheless, the health of these ecosystems, particularly inshore, is declining rapidly.

The dire economic situation and the concentrated population in rural areas have resulted in over-exploitation of inshore marine resources, including fish, coral, and invertebrates. As people strive to make ends meet, inshore marine ecosystems continue to suffer (Obed 2009).

The Plight of the Reefs

Coral reefs have come under tremendous pressure. They are very significant ecologically because the organisms they harbour are integral to marine foodwebs. Moreover, reefs protect shorelines from high energy waves. Destructive fishing methods and climate change are causing severe decline.

Community-based Resource Management in Vanuatu (CBRM)

CBRM takes the form of traditional taboos on fisheries, combined with seasonal harvesting based on traditional knowledge.

The Emua Village Case Study

The village of Emua, on Efate Island, has undertaken community-based resource management to address declining fisheries and deteriorating coastal resources. The establishment of a village committee has brought wider community buy-in to managing water and local fisheries and other resources.

As the capacity of the committee has developed, they have expanded the scope of the project to the catchment as a whole. They have formulated a Community Based Management plan to control resources from the top of the hill to the sea to take account

of wider environmental concerns and the impact of these on the coastal marine area. The committee has negotiated for mitigation of the sediment deposits coming the quarry on the hill which is for road construction. The women on the committee have negotiated for village rubbish removal with the roading construction firm. The erection of a fence around the fresh water supply has stopped contamination by wild pigs. A clam shell farm, turtle monitoring and tuna fisheries are all part of the management programme (photo)

The chief of the village said:

People have come to understand the limitations of resources. Ten years ago people didn't understand that. Now they take ownership. The importance of qualified people in community is that they will advocate for conservation and impart knowledge to community in their vernacular. If you want to think about traditional conservation this needs to be communicated to community. The Environmental Committee means that people are participating and sharing in the responsibilities for conservation (Chief of Emua Village, December 2009).

There is a small tourism venture in Emua village, and there are plans for a more ambitious ecotourism venture as community based sustainable management becomes established. The challenges of such a business is to get tourists to go beyond the main centre, Port Villa and come to stay in villages. The main beneficiaries of tourism confined to Port villa are ex-pats businesses, so a marketing strategy will be an important to the success of a tourism in Emua.



Discussion of fisheries in Vanuatu and Host Tevi Obed preparing refreshments after discussions with Village Environment Committee

Their successes include negotiating the mitigation of the sediment deposition from a hill-country quarry for roading material. The women on the committee have negotiated for village rubbish removal by the roading firm. A newly erected fence around the fresh water supply now prevents contamination by wild pigs. A clam shell farm, turtle monitoring, and tuna fisheries are all part of the management programme.

There is a small tourism venture in Emua village, and there are plans for a more ambitious ecotourism initiative as community-based, sustainable management becomes established.

The Sarakata River Case Study

The Sarakata River Watershed (SRW) is in central South Santo. It encompasses several important water catchments, including the Luganville Municipality water catchment. The catchment provides water for subsistence farming and other livelihood activities, commercial ventures, and domestic use for more than 20,000 local people. The watershed includes the Sarakata River, which is large and flood-prone during the cyclone and rainy seasons. The Sakarita River is dammed and provides most of Luganville's electricity.

An Integrated Water Resource Management project is charged with formulating and implementing a land-use management plan for the watershed, which would ensure sustainable management from ridge to reef. It was important to meet the needs of both the rural and urban populations, and the overarching aim was to provide an exemplary national model. The project was linked to the sustainable development objectives contained in the Land Summit Reform of 2006. It is envisaged that the project become core departmental business rather than being run as a discreet project .

A variety of settlements and commercial enterprises occur within the proposed Luganville water supply protection zone. Their activities impact on the watershed and cause quality concerns for Luganville's domestic water supply. Three other large-scale users extract from this catchment – Fanafo Village, Palon Community, and a private commercial plantation.

Through IWRM approaches, the project will tackle many sustainability issues. These include addressing economic and ecologic dead-zones of oxygen deficient water from human and animal sewage and identifying the multiple stresses on fragile coastal habitats and linking these to freshwater and land management. In this way, IWRM will contribute to improving Vanuatu's coastal fish stocks and general biodiversity.

Water Management in Fiji

The issues canvassed in Fiji centred on marine fisheries. Challenges for Fiji include:

- sedimentation from land activities
- dynamite fishing
- low community awareness of conservation issues
- over-fishing
- undersized catches
- the non-income-generating nature of subsistence fishing.

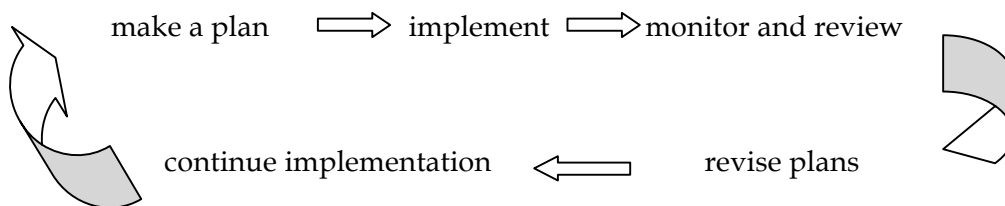
Locally Managed Marine Areas (LMMAs)

The Vision for the LMMA network is 'healthy ecosystems and communities, abundant marine and fish stocks, and sustainable fisheries'.

The LMMA concept was initiated through the US AID Biodiversity Conservation Network (BCN) between 1995 and 1998. Twenty projects across the Asia/Pacific region are involved. LMMA initiatives take an enterprise approach to conservation, using participatory techniques to combine conservation with resource use. LMMAs are managed by local communities in partnership with network support advisors. Through these partnerships, systematic learning and skills development are supported and shared around the network.

Key components of LMMA practice include working within a Learning Framework and adopting Community Based Adaptive Management (CBAM). LMMAs are set up to meet the dual priorities of ensuring the conservation of coastal biodiversity and meeting the needs of local fisheries in developing countries. The LMMA concept thus integrates ecological and socio-economic outcomes.

The components of CBAM are:



Fiji is the centre of a Pacific-wide LMMA network. The initial expectation was to develop 20 sites, but to date 342 LMMA sites involving 550 villages have been developed in seven countries. Since credible data is essential in influencing governments, the network maintains a focus on strengthening data gathering and analysis.

The Nivitili Village Case Study

Nivitili exemplifies how LMMA works through existing village structures. In any Fijian context, it is essential to work with the chief and to complement this by discussing the management plan with the village council.



Betsan visiting Nivitili Village

Nivitili village has undertaken a joint-venture tourism project, which includes arrangements for the mutual benefit of the village and outside interests. The village has leased land to a hotel investor. In return for this, the investor has built an impressive community centre in the village. Water supply in the village is provided by the hotel, and the hotel has a policy to preferentially employ staff from the village. Also, the people of Nivitili have a profitable local outlet for their crafts and other products.

The hotel is adjacent to the village, and both look out on the lagoon. A central feature of the hotel is access to ecotourism. The appeal of local biodiversity and the quality of the marine environment are assured by the conservation aspects of the LMMA. In keeping with adaptive management of resource use, fishing is allowed within sustainable limits. Traditional mechanisms, such as taboos, maintain fish populations. This is beneficial for village food supply and allows some supply to the hotel. It also provides for recreational fishing by tourists.

LMMA's and the New Zealand Context

The marine conservation model in NZ is largely that of protected reserves in which resource use, on both land and sea, is prohibited. In this context the government generally considers it owns conservation and marine zones, although this is contested by the Waitangi Treaty settlement process and can be expected to change through the provisions of the Coastal Marine Takutai Moana legislation of 2011. By contrast in most Pacific Island countries land and sea areas remain in customary title. And so any land- or sea-based conservation initiatives must be developed in agreement with customary owners.

Customary fisheries management is still in development in New Zealand. The combining of biodiversity enhancement and conservation with sustainable resource use for livelihood interests and other non-commercial purposes is an area for fruitful exchange between Māori and Pacific initiatives.

As in the Pacific, Māori customary resource management focuses on the continuity of traditional knowledge by using traditional systems as contemporary management tools. As an example, taboo, or rahui, is a management tool widely used in the Pacific. A rahui has many attributes of adaptive management.

Concluding Comments: Indigenous Interests, Water and Economic Pressures for Development

Large-scale installation of piped (and metered) water in Samoa and a proposal for a hydro-electric power scheme are promoted as being in national interests. However, possibilities of infrastructure development in the national interests often sit in tension with local understandings and outlooks. Infrastructural projects in the interests of national development, even on environmental premises, may camouflage the real interests of global markets. In particular, infrastructural developments could mask an

insidious incursion of reform that undermines customary land tenure and authority over resources.

Requirements for consultation in the interests of accountability and good practice may merely window-dress processes that actually undermine customary tenure and control over economic development. The nature of global market pressures and the full implications of change may not be well understood. Furthermore, if proposals are communicated in English, the values and wisdom embedded in indigenous languages are lost or over-ridden.

Eminent research studies have demonstrated the vital role of local knowledge in decision-making for policy development and legislation around sustainable resource use (Berkes and Folke 1998, Berkes, Colding and Folke 2003; Gunderson and Holling 2002, Ostram 1990). These studies show that sustainability is most robust where communities are directly engaged in managing their lands, fresh water, oceans, resources and food supplies. The huge variations in geography and ecologies mean that local enterprise has to be highly responsive to local conditions and built to the scale of local resources and social capacity. Management of water, fisheries and land for food sovereignty and energy production according to local scales need to be strong dimensions of community sustenance.

Elinor Ostram's scientific account of strong sustainability achieved by local communities making decisions and managing their lands and waters and environmental resources add to the evidence of indigenous peoples that governance and management of their own lands and resources has the best long term environmental, economic and social outcomes. In both cases face-to-face relations between people and with the living world create recognition of interdependence. A distinctive point for indigenous peoples in this relational world view is the geneological relationship with earth and all living things.

Tensions abound in contexts of integrated governance and management; and yet integrated management is the very system that most fairly deals with such conflicts. The challenges of mediation can be met by approaches based on respect for local and indigenous wisdom. With acknowledgement of power differences communities may adopt a unifying regard for shared responsibility in achieving long-term wellbeing of waterways, land, and peoples.

Tabatha Wallington and Geoffrey Lawrence provide an important reference for moving from individualised responsibility towards societal responsibility for outcomes of economic development. Wallington and Lawrence note:

[In Australia] the new devolved governance arrangements aim to cultivate a shared responsibility for environmental sustainability amongst regional actors.

Given that responsibility has been traditionally associated with individuals and their deeds....the desired shift to a more societal or collective understanding of responsibility holds the distinctively radical potential of attending to the 'public' environmental consequences of traditionally 'private' economic development – a shift that brings the social and political nature of responsibility to the fore (2008: 277).

Some collective responsibility is managed through legislation such as the Resource Management Act (RMA) in New Zealand and through regionalised resource management in Australia. A more collective understanding of the long term consequences of individual private business interests nudges us towards ideas of societal responsibility.

Responsibility encompasses an integrated approach to policy development and collaborative decision-making. These are widely regarded as keys to achieving beneficial environmental outcomes. Collaborative decision-making draws together all interested parties and sectors with the opportunity to listen to all contributors and to give consideration to all the concerns brought to the table. Relationship building and respect for differences are fundamental to collaborative processes. Responsibility is a mechanism of providing for accountabilities to policy, financial and legal requirements, as well as of maintaining responsiveness to context, local knowledge and changing conditions. In respect of decisions about water, responsible outcomes could include water quality protections, environmental flows for biodiversity and habitat enhancement, as well as the granting of water rights for extraction, use, and discharge within the requirements of environmental safeguards.

Integrated approaches are often frustrated by separated legal and policy jurisdictions – over forests and fisheries, rivers and agriculture, and private and public property. One of the main challenges to the management of water resources in Pacific countries, including New Zealand, is that **customary land ownership and tribal authority over resources do not correspond with the introduced system of private property** ownership (Hoskins, 2010, Martin 2008). Private property has become embedded as a basis for economic development in countries such as New Zealand along with **systems of centralized government**. Discussions of development in Pacific countries often refer underlying issues of land reform. This usually means opening possibilities of privatization of land to facilitate property sales and access to resources (Iati Iati 2010).

A concept that emerged is of attending to the 'voice' of water and natural ecosystems and to use this voice to inform decision-making. This means trained attention to the condition of rivers supported by a holistic outlook. It will be familiar to those in a close relationship with rivers, coasts, and lands, but may be considered strange in many existing systems of management.

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