SPREP
PROE

CRISP
Coral Reef InitiativeS for the Pacific
Initiatives Corail pour le Pacifique

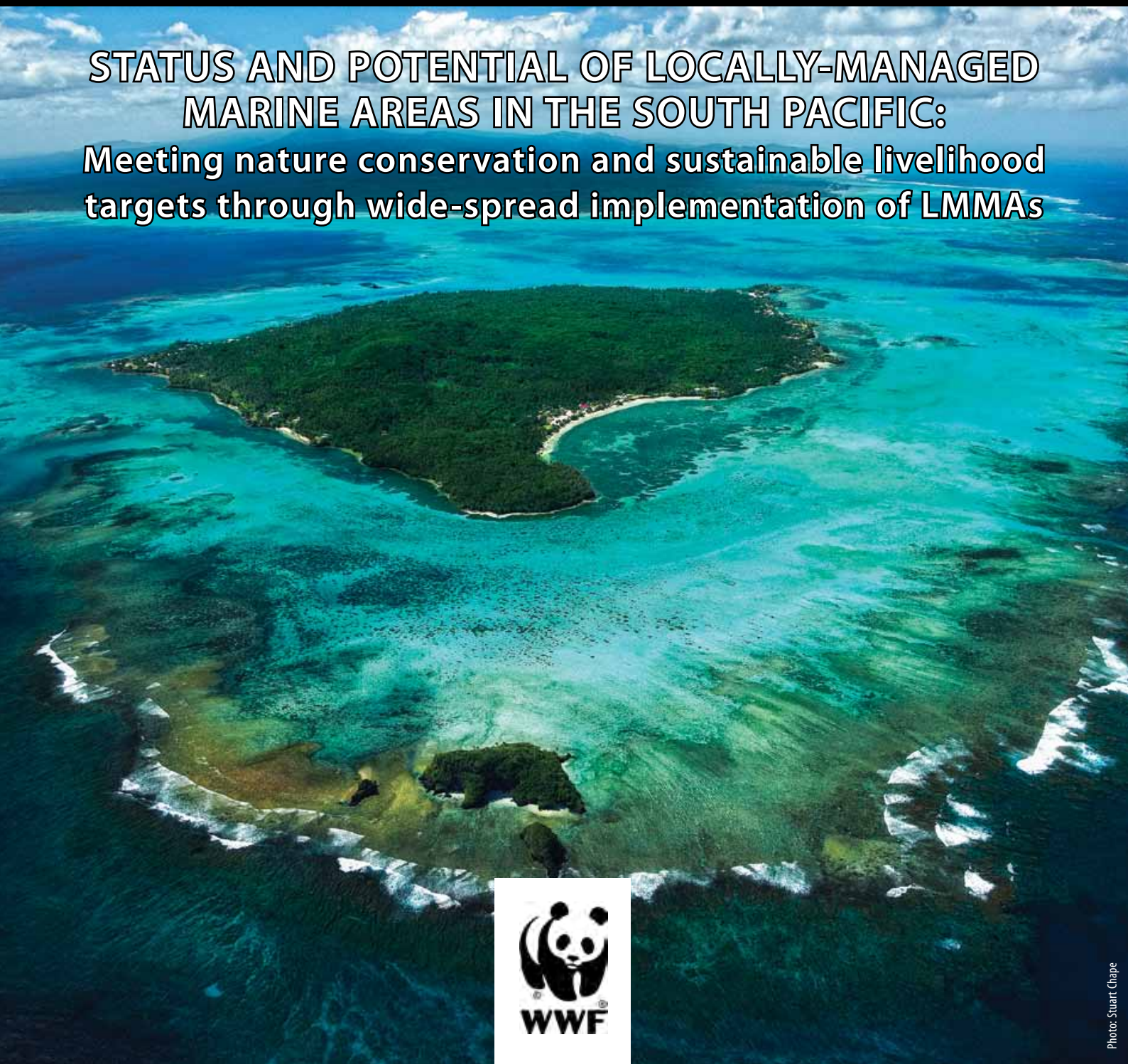
COMPONENT 3A - PROJECT 3A3
Institutional strengthening and technical support

April 2009

STUDY REPORT

STATUS AND POTENTIAL OF LOCALLY-MANAGED MARINE AREAS IN THE SOUTH PACIFIC:

Meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs



WWF

Photo: Stuart Chape

CRISP

Coral Reef InitiativeS for the Pacific
Initiatives Corail pour le Pacifique

The CRISP programme is implemented as part of the policy developed by the Secretariat of the Pacific Regional Environment Programme for a contribution to conservation and sustainable development of coral reefs in the Pacific.

The CRISP Coordinating Unit (CCU) was integrated into the Secretariat of the Pacific Community in April 2008 to insure maximum coordination and synergy in work relating to coral reef management in the region.

The Initiative for the Protection and Management of Coral Reefs in the Pacific (CRISP), sponsored by France and prepared by the French Development Agency (AFD) as part of an inter-ministerial project from 2002 onwards, aims to develop a vision for the future of these unique ecosystems and the communities that depend on them and to introduce strategies and projects to conserve their biodiversity, while developing the economic and environmental services that they provide both locally and globally. Also, it is designed as a factor for integration between developed countries (Australia, New Zealand, Japan and USA), French overseas territories and Pacific Island developing countries.

The CRISP Programme comprises three major components, which are:

Component 1A: Integrated Coastal Management and Watershed Management
- 1A1: Marine biodiversity conservation planning
- 1A2: Marine Protected Areas
- 1A3: Institutional strengthening and networking
- 1A4: Integrated coastal reef zone and watershed management

Component 2: Development of Coral Ecosystems
- 2A: Knowledge, monitoring and management of coral reef ecosytems
- 2B: Reef rehabilitation
- 2C: Bioprospection and marine active substances
- 2D: Development of regional data base (ReefBase Pacific)

Component 3: Programme Coordination and Development
- 3A: Institutional strengthening, technnical support and extension
- 3B: Coordination, promotion and development of CRISP Programme

CRISP Coordinating Unit (CCU)
Programme Manager : **Eric CLUA**
SPC - PO Box D5
98848 Noumea Cedex
New Caledonia
Tel./Fax: (687) 265471
E-mail: ericc@spc.int
www.crisponline.net

COMPONENT 3A

Institutional strengthening, technical support and extension

- **PROJECT 3A-1:**
Institutional support and strengthening of links with member countries

- **PROJECT 3A-2:**
Support to governance through workshops and studies sites

- **PROJECT 3A-3:**
Improvement of socio-economics of coral reefs

- **PROJECT 3A-4:**
Technical and financial support to regional networks and database (GCRMN, SEM-Pasifika, ReefBase Pacific)

- **PROJECT 3A-5:**
Disseminaton of knowledge and lessons learned sensitization of stakeholders

Component Leader:
Caroline VIEUX
SPREP
PO Box 240, Apia
Samoa
Tel.: (685) 21929
Fax: (685) 20231
E-mail: carolinev@sprep.org

Funding agencies:

COMPONENT 3A - PROJECT 3A3
Institutional strengthening and technical support

April 2009

STUDY REPORT

STATUS AND POTENTIAL OF LOCALLY-MANAGED MARINE AREAS IN THE SOUTH PACIFIC:

Meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs

SPREP Library/IRC Cataloguing-in-Publication Data

Govan, Hugh ... [et al.]

Status and potential of locally-managed marine areas in the South Pacific: meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs. – Apia, Samoa SPREP, 2010.

95pp + 5 annexes: 29.7 x 21 cm

ISBN: 978-982-04-0402-1 (print)

978-982-04-0403-8 (online)

1. Marine resources – Oceania. 2. Marine protected areas – Oceania.

3. Protection of natural resources – Oceania. I. Pacific Regional Environment Programme (SPREP) II. Title.

333.917

SPREP
PO BOX 240
Apia
Samoa
Email: sprep@sprep.org
T: +685 21 929
F: +685 20 231
Website: www.sprep.org

Cover image: © Stuart Chape

Design: Joanne Aitken

Author and compiler: Hugh Govan, PO Box S-37, Suva, Fiji [hgovan@gmail.com]

Contributors

The following made important contributions to the report: Alifereti Tawake, Kesaia Tabunakawai, Aaron Jenkins, Antoine Lasgorceix, Anne-Maree Schwarz, Bill Aalbersberg, Bruno Manele, Caroline Vieux, Delvene Notere, Daniel Afzal, Erika Techera, Eroni Tulala Rasalato, Helen Sykes, Hugh Walton, Hugo Tafea, Isoa Korovulavula, James Comley, Jeff Kinch, Jess Feehely, Julie Petit, Louise Heaps, Paul Anderson, Pip Cohen (special thanks for editing), Pulea Ifopo, Ron Vave, Roy Hills, Seini Tawakelevu, Semese Alefaio, Semisi Meo, Shauna Troniak, Siola'a Malimali, Suzie Kukuian, Sylvia George, Talavou Tauaefa, Tevi Obed.

Acknowledgments

Gratitude for interviews and correspondence is due to: Aliti Vunisea, Ana Tiraa, Allan Bero, Barry Lally, Bob Gillett, Brendon Pasisi, Christopher Bartlett, Christophe Chevillon, Dave Fisk, David Malick, Etika Rupeni, Francis Mamou, Franck Magron, Grazia Borrini-Feyerabend, Helen Perks, Jackie Thomas, Jacqueline Evans, Jane Mogina, Jo Axford, Johann Bell, John Parks, John Pita, Jointly Sisiolo, Kiribati Taniera, Kori Raumea, Luanne Losi, Lucy Fish, Ludwig Kumoru, Magali Verducci, Malama Momoemausu, Manuai Matawai, Meghan Gombos, Modi Pontio, Mona Matepi, Olofa Tuaopepe, Pam Seeto, Paul Lokani, Peter Ramohia, Polangu Kusunan, Potuku Chantong, Rebecca Samuel, Richard Hamilton, Selaina Vaitautolu, Selarn Kaluwin, Shankar Aswani, Silverio Wale, Simon Foale, Simon Tiller, Stuart Chape, Sue Taei, Susan Ewen, Tamlong Tabb, Tanya O'Garra, Victor Bonito, Web Kanawi, Wilson Liligeto, Zaidy Khan. Profuse apologies to anyone I may have inadvertently omitted!

Gratitude is due the following organizations for invaluable support: UNEP-WCMC (WDPA), CENESTA, TILCEPA, CEESP, TGER, UNDP-SGP, LMMA, SOPAC, SPREP, SPC, WCPA, WWF, WorldFish, Reefbase and CRISP.

TABLE OF CONTENTS

ACRONYMS

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
AFD	Agence Française de Développement
AIG	Alternative Income Generation
AusAID	Australian Government Overseas Aid Program
BACI	Before–After Control-Impact
BINGO	Big International (Environmental) Non-Government Organization
CBAM	Community Based Adaptive Management
CBD	Convention on Biological Diversity
CBFM	Community Based Fisheries Management
CBM	Community Based Management
CCA	Community Conserved Area
CI	Conservation International
CMT	Customary Marine Tenure
CRISP	Coral Reef Initiative for the South Pacific
EAM	Ecosystem Approach to Management
EBFM	Ecosystem Based Fisheries Management
EBM	Ecosystem Based Management
EEZ	Exclusive Economic Zone
FLMMA	Fiji Locally Managed Marine Area Network
FSPI	Foundation of the Peoples of the South Pacific International
GEF	Global Environment Facility
IAS	Institute of Applied Science
ICCA	Indigenous and Community Conserved Area
ICRAN	International Coral Reef Action Network
IUCN	International Union for Conservation of Nature
LMMA	Locally Managed Marine Area
MDG	Millennium Development Goals
MMA	Marine Managed Area
MPA	Marine Protected Area
NGO	Non-Government Organization
NZAID	New Zealand International Aid & Development Agency
PA	Protected Area
PICT	Pacific Island Countries and Territories
PLA	Participatory Learning and Action
PRA	Participatory Rural Appraisal
SILMMA	Solomon Islands Locally Managed Marine Area Network
SOPAC	Secretariat of the Pacific Islands Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPREP	Secretariat for the Regional Environment Program
TNC	The Nature Conservancy
UN	United Nations
USP	University of the South Pacific
WFC	WorldFish Center
WMA	Wildlife Management Area
WSSD	World Summit (on) Sustainable Development
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

The South Pacific[1] has experienced a remarkable proliferation of Marine Managed Areas (MMAs) in the last decade. These protected areas, implemented by over 500 communities spanning 15 independent countries and territories represent a unique global achievement. The approaches being developed at national levels are built on a unique feature of the region, customary tenure and resource access, and make use of, in most cases, existing community strengths in traditional knowledge and governance, combined with a local awareness of the need for action, resulting in what have been most aptly termed Locally Managed Marine Areas (LMMAs). The main driver in most cases, is a community desire to maintain or improve livelihoods, often related to perceived threats to food security or local economic revenue. In the South Pacific, conservation and sustainable use are often seen as inseparable as part of the surviving concepts of traditional environmental stewardship. The extent of **this shift towards Community Based Resource Management in Melanesia and Polynesia is unprecedented on a global scale** and is the subject of this report.

The **benefits of LMMAs and community-based resource management are many**. Not least, communities anecdotally report rapid and appreciable increases of marine resources within closed areas. There is also now an increasing body of technical literature which seems to confirm these observations and indeed the potential speed at which this may occur, and these increases seem likely to reflect positive impacts on the biodiversity within these areas. Evidence for significant fishery impacts such as increased landings or catch per unit effort is scarcer, possibly reflecting a greater time period required for such impacts to be observable.

The success of these community based management approaches comes at a time when the region faces enormous **challenges to food security, biodiversity and adaptation to climate change**. The population in the South Pacific is projected to double in the next 30 years. This combined with poor performance of national economies and growing inequalities due to the distribution and access to economic opportunities is leading to problems associated with poverty in most of the independent countries and increased pressure on natural resources leading to erosion of biodiversity and livelihood opportunities, increasingly resulting in conflict and law and order problems. The dependency on fisheries seems likely to spark a crisis of considerable proportions, particularly in Melanesia where high population growth and predominantly rural populations with few economic alternatives have projected food requirements well in excess of what coastal areas are currently likely to produce without significant improvements in management and productivity.

These pressures are already taking their toll on **biodiversity and ecosystem integrity**, which is of great concern as the Pacific region is one of the world's centres of biodiversity, or species richness (i.e. endemism), possessing the most extensive coral reef systems. Countries are attempting to manage vast tracks of coastline comparable in extent to those in developed neighbours but with virtually insignificant budgets for this purpose, consequently, low cost self-sustaining management options are required.

A regional inventory of LMMAs has been compiled as a main output of the current study, drawing on and complementing two previous attempts. Data captured prior to the study appears to be extremely variable, generally under-reporting active Community Conserved Areas (CCAs) and vastly inflating MMA coverage with inactive or inappropriate sites, particularly in Tonga, Papua New Guinea (PNG) and Solomon Islands. Data captured during the present study, current up to January 2008, was compared with data provided

1 For the purposes of this report the South Pacific comprises countries and territories South of the equator, corresponding with Melanesia and Polynesia: Papua New Guinea, Fiji Islands, Solomon Islands, New Caledonia, Vanuatu, French Polynesia, Samoa, Tonga, American Samoa, Wallis and Futuna, Cook Islands, Tuvalu, Niue, Tokelau

by the World Database of Protected Areas (WDPA) and used in place of "official" country lists (which were lacking except for Tonga, Cook Islands, New Caledonia and French Polynesia).

The results show that a locally managed approach to protected areas **is virtually the only approach to MMAs actively pursued at present in the independent countries** of the Pacific Islands Region. Most countries do not maintain an up to date national list and hitherto reliance has been on data voluntarily submitted to the WDPA. Given the discrepancies detected in global Protected Area (PA) databases, **the figures for LMMAs collected in this inventory provide the best picture of current MMA coverage of some 30,000 km^2.**

In the independent countries, the effort of communities and their supporting governmental and non-governmental partners has resulted in over 12,000 km^2 coming under active management of which more than 1,000 km^2 are "no-take". This progress comes at a time when **older models of larger, centrally planned reserves have failed in almost all cases resulting in the need to review the inclusion of some 14,000 km^2 of such "paper parks" in national and global databases of the region**.

	Protected Areas with a marine component[1]	Locally managed marine areas[2]	Community Conserved areas[2]	No-take zones[2]	MMA coverage, all records (km^2)	LMMA coverage (km^2)	No-take Zones (km^2)
Cook Islands	8	23	23	24	19	18	19
Fiji	45	217	217	222	10,880	10,816	593
Papua New Guinea	92	86	79	94	3,764*	59	18
Samoa	8	59	82	82	209	120	16
Solomon Islands	22	113	109	115	1,381*	941	311
Tonga	12	6	0	9	10,009*	93	10
Tuvalu	1	10	10	3	76	76	50
Vanuatu	26	44	44	44	89	58	89
Totals	214	558	564	593	26,427*	12,180	1,107

* Considered to be substantially inaccurate.

1 World Database of Protected Areas, January 2008.

2 Definitions in main text, LMMAs may contain one or more CCAs or no-take zones.

With regards to international or national commitments to Marine Protected Area (MPA) coverage of Exclusive Economic Zones (EEZs) or marine habitat types, an immediate challenge facing the region is that, with the possible exception of the two Samoas, these commitments do not appear to have been interpreted in the light of nationally available data on coastal areas, habitats and ecological regions and thus hinder analysis of progress. A preliminary analysis suggests that Fiji, New Caledonia and French Polynesia could be on track to meeting their commitments at the inshore or coral reef ecosystem level. However, the situation for other countries is cause for concern and all countries are far from meeting their commitments of "strict protection". **The regional MMA coverage represents under 0.2% of the combined EEZ and only Fiji and New Caledonia are within reach of the global average of 1.5% of EEZ protected with 0.8% and 0.9%** respectively.

Samoa has shown strong government investment (originally supported by AusAID) in community-based fisheries management that had resulted by the late 1990s in a national network of dozens of village fisheries management areas, some 50 appear to be active today and the numbers remain steady or slowly increasing.

Also in Samoa, the Environment Department is supporting more than 20 communities implementing no-take reserves within the two large co-managed MPA systems of Aleipata and Safata.

Fiji has shown an impressive rate of expansion supported by a national network of Non-Government Organizations (NGOs) and government organizations promoting LMMAs known as Fiji LMMA (FLMMA). More than 200 villages spread across the 14 provinces in Fiji have established some form of community-based management measures and the numbers have increased steadily every year over the last decade. This is due in part to the snow-ball effects which have seen skills passed from village to village and requests from interested communities surpassing available support capacity. Fiji makes by far the biggest contribution to area under management (10,800 km^2) and no-take (600 km^2) of the South Pacific countries.

Many communities in Vanuatu have preserved traditional management in the form of 'tabu' areas and in others this tradition has been revived with the support of fisheries officers, other government organizations and NGOs. Over 40 villages have been reported to manage their marine resources in this manner in Vanuatu but the real numbers may be significantly higher. Cook Islands has maintained traditional taboos known as ra'ui of which 15 are recorded in the outer islands. Ra'ui were reintroduced on the main island of Rarotonga in 1998 and six are still active. Solomon Islands has seen some of the most impressive progress in the last few years with currently over 100 NGO-supported LMMAs, Tuvalu too is promising significant gains with communities keen to register or revive up to 10 local conservation areas. PNG has seen progress with strategies becoming more defined locally but the country as a whole faces considerable challenges in achieving management of its vast coastal areas. Initiatives are in the early stages for Tonga which has seen the establishment of six special management areas under a Fisheries Division nation-wide strategy.

The dependent states and territories are progressing well using more Western style protected area approaches and New Caledonia has recently made impressive progress with the declaration of a large lagoonal World Heritage Area. American Samoa and French Polynesia are combining traditional resource management and sustainable use approaches with national protected area systems.

	Protected Areas with a marine component	MMA coverage, all records (km^2)	LMMA coverage (km^2)	No-take Zones (km^2)
American Samoa	19	174	>2.6	159
French Polynesia	10	2,837	441	1,282
New Caledonia[1]	20	16,188	-	445
Niue	3	31	>0	>0
Tokelau	3	1	1	?
Wallis and Futuna	0	0	0	0
Totals	55	19,229	445	1,886

1 Excluding World Heritage site declared in 2008 comprising 28,614 km^2.

The spread and endurance of these LMMAs is attributable in great part to the perception of communities that benefits are, or are very likely to be, achieved. Such benefits include recovery of natural resources, improved food security, increased economic opportunities, improved governance, access to information and services, health impacts, improved security of tenure, cultural recovery and strengthening community organization. Less explicit benefits also include opportunities to exclude outsiders to the "fringe benefits" and "resource capture"of working with outside agencies, some of which offer incentives or payments for conservation, or promise alternative livelihood and income generation projects.

The increased abundance of target species within closed areas has been quantifiably verified but less scientific evidence has been gathered for other ecological and social benefits. It is likely that communities perceive some combination of benefits that, together, in sum are an acceptable return on their investment and opportunity costs. Perhaps the major benefit is the realization by that increased control and resilience of the resources upon which they rely can be afforded by enhancing resource management activities.

Despite difficulties in quantifying the impact of LMMA approaches on livelihoods, the information that is available combined with the absence or failure of alternative approaches strongly supports community-based adaptive management as the fundamental building block of a holistic or integrated island management or ecosystem approach.

Some of the major innovations that have supported the proliferation of LMMAs have been the operation of clusters of sites supported by regional, national and sub-national umbrellas or social networks. Others include the use by support agencies of simple participatory learning and action approaches, the development of more support oriented roles by government agencies, a burgeoning recognition of the importance of cost-effectiveness and the development in some cases of supportive legal frameworks.

Nonetheless, community-based resource management is not fully supported in the legislation of many countries and there is wide variability in the cost of supporting community based approaches which overall have directly or indirectly absorbed well over US$ 40 million in project costs over the last decade. Community-based management can be carried out at a fraction of this amount, the bulk of costs going to salaries and transport of extension staff and information dissemination and workshops.

Though wide-spread implementation of LMMAs will result in an increase in the number of marine protected areas, concentrating on this aspect alone would be costly and hard to sustain. Significant environmental or fishery benefits from the possible increases in numbers of no-take zones are not likely unless communities address other issues in their wider fishing area and watersheds not necessarily addressed through closed areas. Evidence suggests that such integrated approaches are entirely possible and that average costs at economies of scale may feasibly be in the order of hundreds of dollars per community based on annual costs from Samoa and Fiji, which are estimated at US$ 1,344 and US$ 800 respectively per village. It is possible that a sustained investment in the order of US$ 0.1-0.5 million dollars per year over at least a 10 year period would be necessary to establish a national decentralized system of support for community-based adaptive management, although some approaches currently being piloted elsewhere are orders of magnitude more expensive and may not have widespread applicability.

Realizing the full potential of local management would best be carried out under the auspices of national or provincial or local-level governments in collaboration with civil society groups and NGOs to develop cost effective mechanisms for the support and coordination of adaptive management in any and all communities which are experiencing natural resource threats, or for those that wish to manage their resources sustainably now and into the future. Such widespread approaches would be necessary to reduce costs and ensure an affordable long term resource management strategy best adapted to achieving not only national commitments to protected areas but also priorities relating to livelihoods such as food security, community and ecosystem resilience and adaptation to climate change.

Key criteria for adopting such a resource management scenario as the generalized national approach would include:

- Designed to fully integrate into government functions over the medium term (applies to Melanesia),
- Decentralized into logistically functional management areas (provinces or similar),
- Cost effectiveness to improve the likelihood of sustainable financing within government budgets or from donors,

- Staggered or cumulative approach optimizing trickle down or snowballing effects.
- Simple but strategic overview and minimum data collection to enable the ongoing identification of gaps (objectives, species, habitats, coverage and so on).

The following recommendations are made with a view to maximizing the potential of LMMAs in achieving widespread benefits to livelihoods and the maintenance of biodiversity:

Government and institutional recommendations

- **Enhancing the role of government:** Future support should seek to consolidate the long-term role of the various levels of government in supporting and coordinating local marine resource management. Such a strategy, ideally decentralized, might be implemented in a gradual or staggered fashion and would require strong collaboration from civil society organizations and NGOs in achieving government institutional development goals. An important tool will be national or sub-national social networks or support umbrellas.
- **Multi-sector integration in practice**: Fisheries and environmental sectors will need to put into practice effective and on the ground collaboration to support communities in achieving local and national sustainable development priorities. Legislation for inshore fisheries, protected areas and wider environmental management will need to be improved in tandem.
- **Integrated island management as the goal:** MPAs alone will be fragile, costly and unlikely to achieve long-term community or national benefits. The adaptive management processes central to LMMAs should be built on to include ecosystem-wide (particularly terrestrial) and sustainable development issues and incorporate climate change adaptation and community and ecosystem resilience. Some large scale pilots of such approaches may be appropriate where sufficient experience has not been attained.
- **Enabling environment**: Institutions and legislation will need to develop in a fashion more support for community initiatives incorporating sustainable management of resources and remove bureaucratic bottle-necks currently insurmountable by communities.
- **Tenure and traditional governance**: The success of local management approaches hinges largely on traditional tenure and governance systems. Great care should be taken before undermining or reforming these systems. It will be important to develop guidance for practitioners to be sensitized around the issues of tenure, and for improving the use of traditional ecological knowledge and other related social factors in each country.
- **Characterize and defend local and cultural approaches**: LMMAs have developed in response to local needs and culture and may often have characteristics such as small size, periodic opening and location determined by social rather than biological factors. International bodies are not necessarily aware of this and these characteristics may require clarification to them before international definitions of Protected Areas or Conservation can be assumed to be regionally applicable.

Financial and economic recommendations

- **Cost effectiveness:** National budgets of Pacific Island Countries are amongst the smallest in the world and face considerable demands to meet human development priorities such as health, education and food production. High priority should be placed on cost-effectiveness of environmental management approaches and maximizing the range of livelihood benefits for such approaches to be mainstreamed into planning and development strategies for governments.
- **Sustainable financing:** As an essential prerequisite to sustainable financing strategies, cost effectiveness of marine resource management approaches must be assessed and improved. Long term

government budgetary support for inter-linked approaches that build on community management needs to be secured. Trust funds and corresponding legal contracts may be able to play a crucial role in ensuring the constant and long term financing of such core government activities and may be able to safeguard against likely donor fatigue or reallocation of essential operating budgets.

- **Debunking alternative income generation**: While there is evidence to suggest that wide-scale support of local resource management will improve livelihoods in terms of food security there is little evidence that provision of "income generation projects" can be feasibly implemented or have beneficial management or conservation impacts to off-set the continued over-exploitation of targeted resources. As such approaches often serve as an unsustainable incentive which deter or distract communities from more effective resource management. Considerable discussion and assessments are required before investments are made in "alternative income generation" approaches as part of any marine resource management strategies.

Operational and implementation recommendations

- **Appropriate monitoring:** A process of ongoing community discussion and review of progress seems essential to community-based adaptive management. However, quantitative and scientific monitoring has not met expectations at the community level to date and given its cost and reliance on external expertise should not be promoted without first testing and discarding simpler (e.g. perceptual) approaches reliant on existing community knowledge and expertise. Monitoring at a national level will be necessary for coordination, but again this should be designed bearing in mind cost and simplicity of implementation to provide results useful to decision-makers.
- **Improve and enhance participatory processes:** Ongoing evaluation of techniques and processes used to promote and support community management should be performed. Issues that may need particular attention include community involvement, self-reliance and empowerment and the development of appropriate mixes of traditional and national governance and marine tenure in Western Melanesia.
- **Research needs**: Under the local management model communities contain the key decision-makers and resource managers. Researchers and technical institutions urgently need to improve processes to identify community priority information needs and to ensure necessary information reaches communities in a timely and useable fashion.

The Pacific Islands nations are facing formidable challenges in terms of mounting pressures on finite natural resources, market forces and the commoditization of natural resources, burgeoning populations and adaptation to the far-reaching impacts of climate change. The lessons learned in achieving the wide proliferation of locally managed marine areas will be key to adopting viable strategies for surmounting these challenges but only if focus can be widened to encompass their full potential as building blocks for integrated island management in support of resilient Pacific Island communities.

Status and potential of locally-managed marine areas in the South Pacific:

meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs

INTRODUCTION

The increasing pressures exerted by mankind on the global environment have resulted in many proposed strategies to mitigate or reverse the degradation that is increasingly evident. Ironically, one strategy that is receiving growing endorsement also happens to be amongst the most ancient[2]. Indigenous peoples and local communities have for millennia played a critical role in conserving natural environments and species. They have done so for a variety of purposes; livelihood-related as well as cultural, spiritual, aesthetic and security-related. Some degree of recognition has been afforded in that the term "Indigenous and Community Conserved Areas" (ICCAs) is now globally adopted to represent specific sites, resources or species (where areas refer to the species' habitats) voluntarily conserved through community values, practices, rules and institutions[3].

In the marine context the establishment and effective management of Community-Based or Locally Managed Marine Areas (LMMAs) and Marine Protected Areas (MPAs) is increasingly being used by many Pacific Island communities with the intention of sustaining their fish supply and marine tenure systems provide a strong enabling environment to support this level of stewardship. These tools can address some of the challenges, but seem to require significant commitment of resources and capacity building in order to realize their potential as national strategies for sustainable development as well as conservation.

Upscaling this kind of community action to achieve international commitments to development and biodiversity conservation agendas represents even more of a challenge for the region. The Millennium Development Goals (MDGs) largely hinge on goal #7 "Ensure environmental sustainability" to achieve poverty reduction and sustainable development[4]. Connected to this, the global World Summit on Sustainable Development (WSSD) and Convention for Biodiversity (CBD) target of '*establishing and implementing a network of effectively managed, ecologically representative MPAs covering at least 10% of the world's seas by the year 2020*' is a very significant challenge, with formal commitments to MPAs in the Pacific Islands Region representing only approximately 2% of the combined Exclusive Economic Zones (EEZs) of the Pacific Island Countries (over 38.5 million km^2)[5].

A 2001 survey of MPAs and Marine Managed Areas (MMAs) in the Pacific listed 130 MPAs in 14 countries but data are incomplete and concerns are raised over the "paper park" status of most of the MPAs and the need for an up-to-date Pacific-wide inventory is clear[6]. Increasingly, opportunities are presenting themselves to increase the number of marine areas receiving some form of protection and/or sustainable resource management. Following the significant commitment made by the Fiji Government to establish a network of MPAs in 30% of Fiji's waters, the Federated States of Micronesia at the CBD Conference of the Parties (CoP) in Curitiba in Brazil, in 2006 committed to establishing MPAs in 25% of their EEZ.

The multi-partner *Coral Triangle Initiative* also aims to raise the profile of MPAs and Marine Managed Areas (MMAs) in terms of achieving improved sustainable resource management and biodiversity conservation in the region. The overarching [*draft*] objective for the MPA component of the Coral Triangle Initiative is '*By 2020, region-wide Coral Triangle MPA system (CTMAS) is in place and fully functional*'. It is critical that baseline

2 World Parks Congress – 2003, – Programme of Work on Protected Areas of the Convention on Biological Diversity (CBD) – 2004 and First Congress on Marine Protected Areas – 2005, IUCN 2008

3 Borrini-Feyerabend, Kothari and Oviedo, 2004

4 Ruddle 2008

5 Benzaken et al. 2007

6 Huber and McGregor 2002

information is available to influence how donors are prioritizing marine and community-based activities and to seek future large scale support for community-based sustainable resource management.

The present document aims to assess the contribution of Community-Based MMAs and gazetted MPAs to the global WSSD and CBD MPA target of 10% coverage in the Pacific by 2020 as well as to livelihood needs and specifically:

- Establish the current status of community based sites in the Pacific Islands Region, in terms of their size, number, location and so forth, and the legislative, governance and other management processes used in their establishment and implementation;
- Assess the cost and overall effectiveness of these different community-based management sites and tools.
- Recommend potential strategies to achieve the level of upscaling that is required to achieve development and conservation targets and agendas.

Aroko/Muri Ra'ui, Rarotonga Island, Cook Islands[7]

Aerial view of the Avana Muri Lagoon (Credit: Ewan Smith)

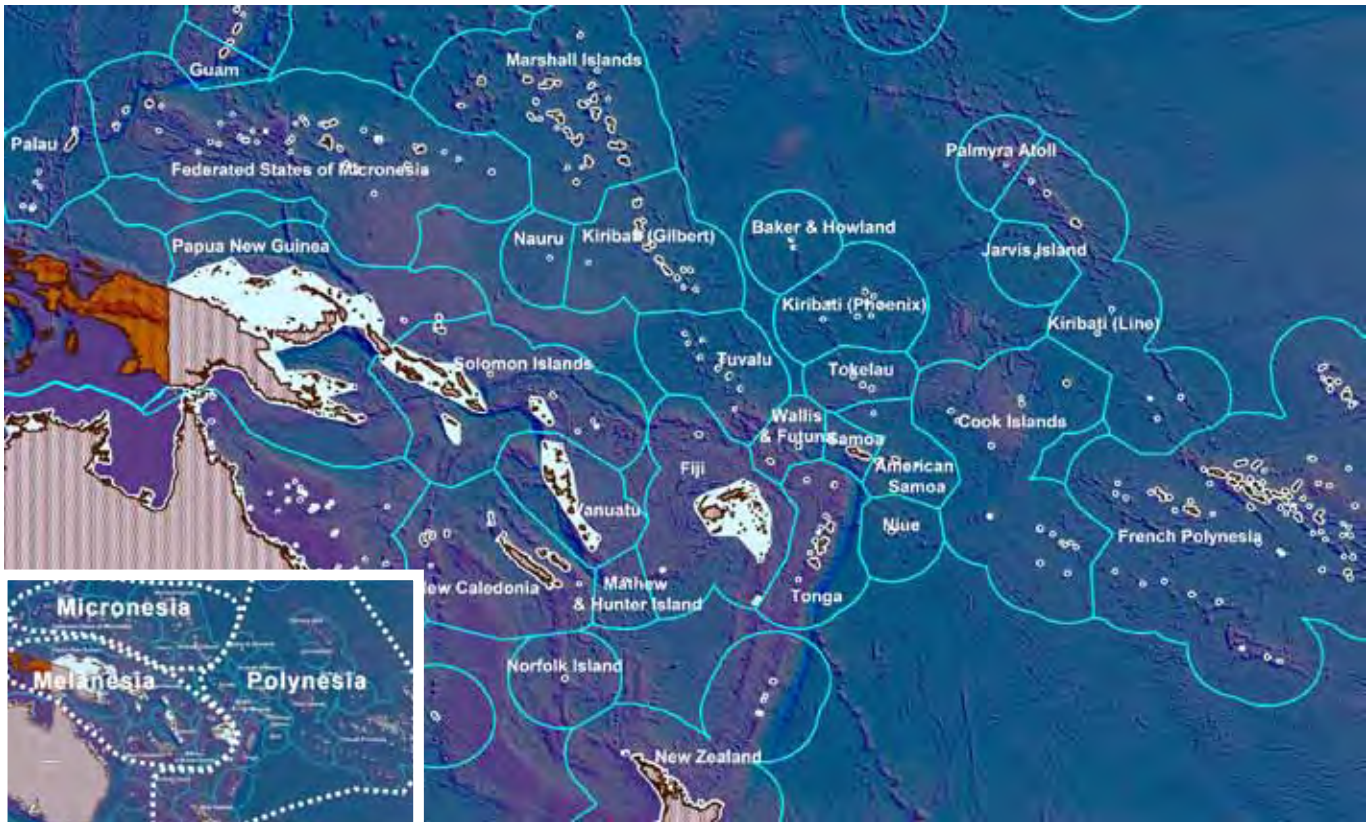
Ra'ui or traditional bans have been a resource management and governance system in the Cook Islands for centuries. Ra'ui may be total bans on access to an area or bans on particular resources and may be permanent or more frequently may be periodic or temporary. While these continue in much the same way in the outer islands the use of Ra'ui declined in the 1970's in the main and most developed island of Rarotonga. The late 1990's saw a revival of the Ra'ui system promoted by the Koutou Nui (the Lower House of Traditional Chiefs) and Ra'ui were reinstated in 6 different lagoon areas around Rarotonga. The Aroko-Muri Ra'ui is the largest of these and though it has waxed and waned still exists today.

7 Prepared by Sylvia T George, Mona Matepi and Hugh Govan for Govan et al. In press.

THE PACIFIC ISLANDS AND THEIR OCEAN

The Pacific Ocean occupies half of the earth's sea surface and more than a third of the Earth's surface, around 180 million square kilometers. Some 200 high islands and 2,500 low islands or atolls make up the 22 Pacific Islands Countries and dependent Territories (PICTs)[8]. Though small in terms of land mass[9] these PICTs have exclusive rights to the exploitation of approximately 30 million square kilometers of sea area delimited by their EEZ (Figure 1).

Figure 1. Pacific Island Countries and Territories showing boundaries of Exclusive Economic Zones and territorial seas. Inset shows the regions of Melanesia, Polynesia and Micronesia. (Pacific Islands Regional Maritime Boundaries Project, SOPAC www.sopac.org)



The geographical characteristics of the region have to some extent shaped the cultures of its people (Figure 1. Pacific Island Countries and Territories showing boundaries of Exclusive Economic Zones and territorial seas. Inset shows the regions of Melanesia, Polynesia and Micronesia. (Pacific Islands Regional Maritime Boundaries Project, SOPAC www.sopac.org)1). The ancestors of the Melanesians arrived some 50,000 years ago and settled in the high islands of the Western Pacific. With abundant resources and a complex topography, Melanesian communities developed largely isolated from one another, leading to a diversity of languages and cultural traits. The resource-poor islands of Polynesia and Micronesia on the other hand, provided incentives to subsequent waves of settlers for the undertaking of long ocean voyages and expansion into the Northern, Southern and Eastern edges of the Pacific Ocean[10].

8 World Bank 2000b.

9 With the exception of Papua New Guinea.

10 World Bank 2000b.

The present day population of Melanesia comprises some 87% of the total, inhabiting 98% of the land mass with some three quarters of the region's coastline (Table 1. Population, land and sea characteristics of Pacific Island Countries and Territories (SPC and SOPAC).1). In contrast Polynesia and Micronesia account for 7% and 6% of the population respectively, inhabiting a minuscule fraction of the regional land mass but with rights over three quarters of the regional EEZ.

Since 1962, when Samoa became the first Pacific Island nation to regain independence, a total of 12 countries are now independent including Tonga which was never colonized. These countries are governed by their indigenous populations but the remaining 10 territories (Table 1. Population, land and sea characteristics of Pacific Island Countries and Territories (SPC and SOPAC).1) remain in some form of association with France, New Zealand, USA or the UK. The present report covers the South Pacific consisting of the countries of Melanesia and Polynesia south of the equator.

Table 1. Population, land and sea characteristics of Pacific Island Countries and Territories (SPC and SOPAC[11]).

Region/country/island (country of association)	Popul'n (2007 est.)	Land area (km^2)	Pop'n density ($/km^2$)	Annual growth rate (%)	Coast line (km)	EEZ Area (km^2)
MELANESIA	8,137,100	540,248	15	2.1	39,496	8,170,000
Papua New Guinea	6,332,750	462,840	14	2.2	20,197	3,120,000
Fiji Islands	831,600	18,272	46	0.5	4,637	1,290,000
Solomon Islands	503,900	28,370	18	2.7	9,880	1,340,000
New Caledonia (Fra.)	241,700	18,576	13	1.6	2,254	1,740,000
Vanuatu	227,150	12,190	19	2.6	2,528	680,000
POLYNESIA	649,650	8,021	81	0.8	3,952	10,794,426
French Polynesia (Fra.)	261,400	3,521	74	1.3	2,525	5,030,000
Samoa	179,500	2,935	61	0.1	403	120,000
Tonga	102,300	650	157	0.4	419	700,000
American Samoa (U.S.)	65,000	200	325	1.7	116	390,000
Wallis and Futuna (Fra.)	15,400	142	108	0.7	129	300,000
Cook Islands (N.Z.)	13,500	237	83	-1.5	120	1,830,000
Tuvalu	9,700	26	373	0.3	24	900,000
Niue (N.Z.)	1,600	259	6	-2.4	64	390,000
Tokelau (N.Z.)	1,200	12	100	0.0	101	290,000
Pitcairn Islands (U.K.)	50	39	1	n.a.	51	844,426
MICRONESIA	545,900	3,214	170	1.6	10,782	10,405,000
Guam (U.S.)	172,300	541	318	1.9	126	218,000
Federated States of Micronesia	110,600	701	158	0.5	6,112	2,780,000
Kiribati	95,500	811	118	1.9	1,143	3,550,000
Northern Mariana Islands (U.S.)	84,700	471	180	2.7	1,482	777,000
Marshall Islands	52,700	181	291	1.0	370	2,131,000

11 Population and land area data Secretariat of the Pacific Community (http://www.spc.int/sdp), EEZ and coastline data from Pacific Islands Applied Geoscience Commission (http://www.sopac.org)

Palau	20,200	488	41	0.6	1,519	629,000
Nauru	9,900	21	471	2.3	30	320,000
TOTAL	9,332,650	551,483	17	2.0	54,230	29,369,426

Pacific Islands diversity

Though the region is often referred to as a single entity such as Oceania, the Pacific or the South Pacific, it is in fact an extremely humanly diverse region with over one thousand different ethnic groups and languages. The four westernmost Melanesian countries consistently rate amongst the 15 most culturally and linguistically diverse countries at a global level whether measured in terms of ethnic groups, religions or languages and adjusted for population size or land area[12].

The total variety exhibited by the world's natural and cultural systems, known as biocultural diversity, is also extremely high for the Melanesian countries even without the inclusion of the rich marine biodiversity as until recently few data sets were available for marine biodiversity in these countries[13] (TaTable 2. Population, language (Gordon 2005) and biocultural diversity (Harmon and Loh 2004) of Pacific Island Countries and Territories (population as for TaTable 1. Population, land and sea characteristics of Pacific Island Countries and Territories (SPC and SOPAC).

Table 2. Population, language (Gordon 2005) and biocultural diversity (Harmon and Loh 2004) of Pacific Island Countries and Territories (population as for TaTable 1. Population, land and sea characteristics of Pacific Island Countries and Territories (SPC and SOPAC)..

Region/country/island (country of association)	Popul'n (2007 est.)	Popul'n density (/ km^2)	Urban population (%)	Languages	Biocultural diversity ranking
MELANESIA	8,137,100	15		1,042	
Papua New Guinea	6,332,750	14	13	819	1
Fiji Islands	831,600	46	46	9	101
Solomon Islands	503,900	18	16	69	6
New Caledonia (Fra.)	241,700	13	63	38	22
Vanuatu	227,150	19	21	107	17
POLYNESIA	649,650	81		23	
French Polynesia (Fra.)	261,400	74	53	8	-
Samoa	179,500	61	21	1	170
Tonga	102,300	157	23	2	129
American Samoa (U.S.)	65,000	325	50	1	-
Wallis and Futuna (Fra.)	15,400	108	0	2	-
Cook Islands (N.Z.)	13,500	83	72	4	106
Tuvalu	9,700	373	47	2	156
Niue (N.Z.)	1,600	6	36	1	-

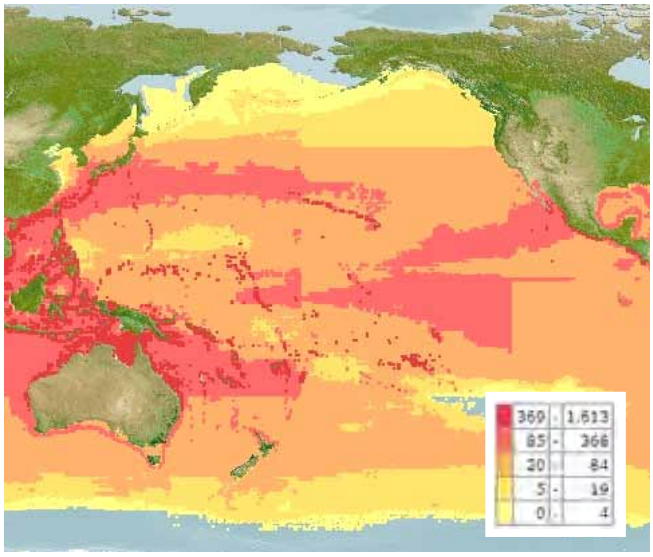
12 Harmon and Loh 2004, Loh and Harmon 2005.

13 Fedder and Govan 2007

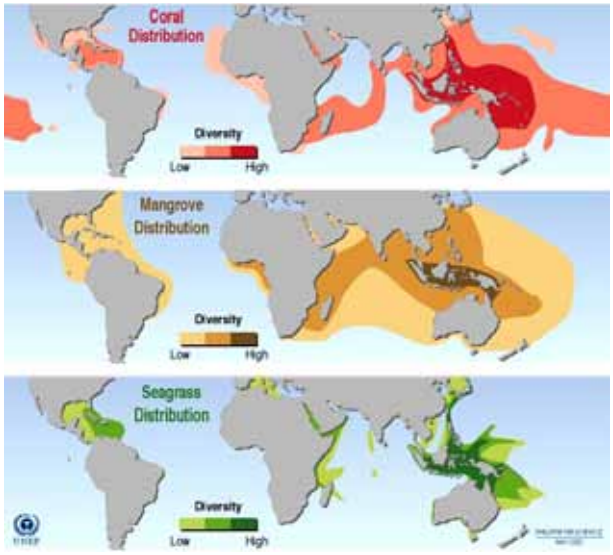
Tokelau (N.Z.)	1,200	100	0	1	-
Pitcairn Islands (U.K.)	50	1	n.a.	1	-
MICRONESIA	545,900	170		28	
Guam (U.S.)	172,300	318	93	1	183
Federated States of Micronesia	110,600	158	22	17	55
Kiribati	95,500	118	44	1	208
Northern Mariana Islands (U.S.)	84,700	180	90	3	-
Marshall Islands	52,700	291	68	1	211
Palau	20,200	41	64	3	58
Nauru	9,900	471	100	2	167
TOTAL	9,332,650	17			

Figure 2. Marine biodiversity in the Pacific Ocean. A. Species richness map for animals in the Pacific Ocean, 7242 species used in analysis (Fishbase/OBIS[14]). B. Global distribution of coral, mangrove and sea grass diversity (UNEP/WCMC 2001)

A



B



The Pacific region is one of the world's centres of biological diversity, or species richness (FigFigure 2. Marine biodiversity in the Pacific Ocean. A. Species richness map for animals in the Pacific Ocean, 7242 species used in analysis (Fishbase/OBIS). B. Global distribution of coral, mangrove and sea grass diversity (UNEP/WCMC 2001) possessing the most extensive coral reef system and the highest marine diversity in the world particularly in the western Pacific in the area known as the Coral Triangle. The evolution of species and characteristics of the island region have led to a high endemism in terrestrial species, particularly on larger islands, which can also have a high biological diversity. The warm tropical waters of the Pacific have also afforded a high level of speciation. However, the terrestrial and particularly marine biodiversity are still considered to be poorly inventoried or understood by western science[15].

14 http://fishbase.sinica.edu.tw/tools/AquaMaps/tools/dynamicRichness.php and http://www.obis.org.au

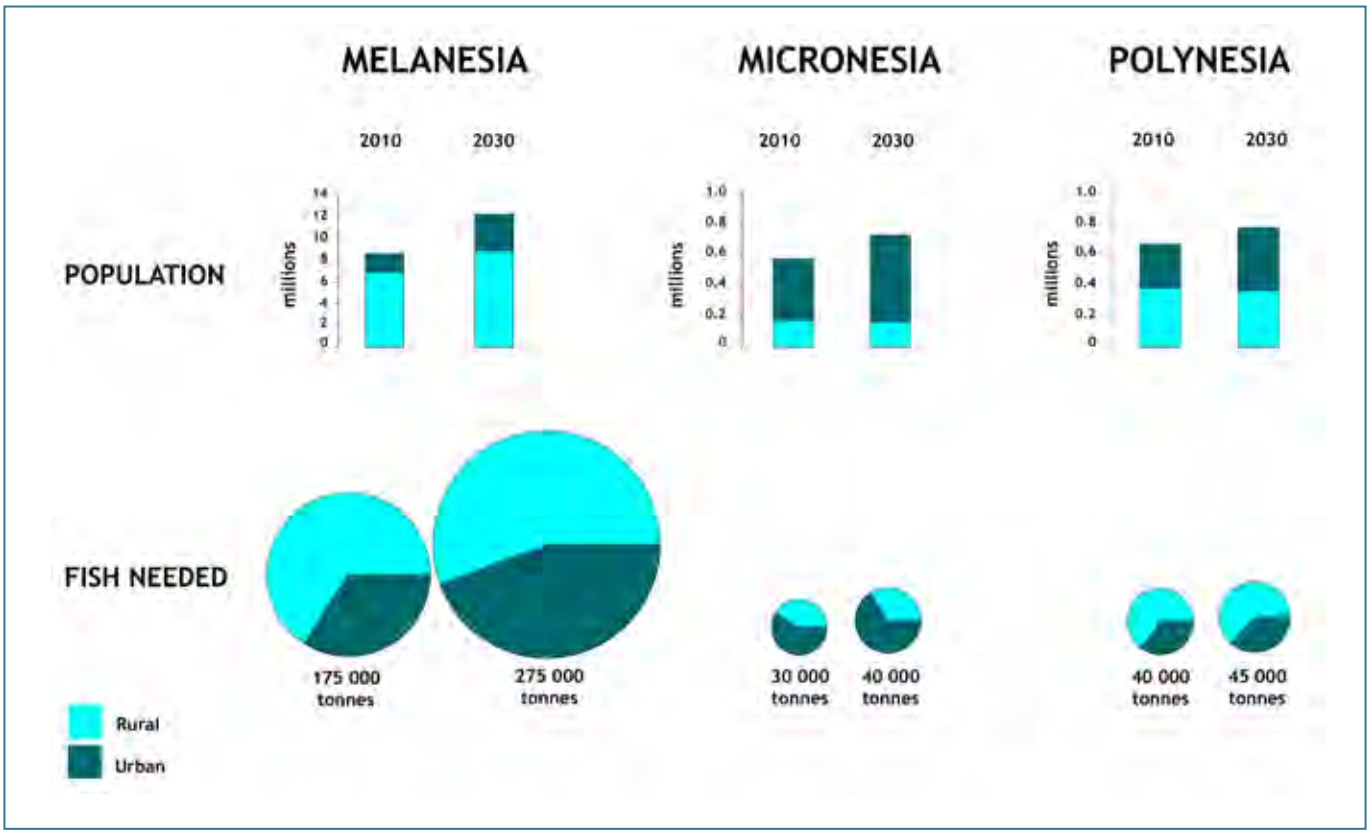
15 McIntyre 2005

Pacific Islands challenges

The population of 9.3 million in the PICTs is projected to double in the next 30 years, and will exacerbate the already high population densities on some islands. This combined with poor economic performance and growing inequalities is leading to problems associated with poverty in most of the independent countries. Indicators of poverty and human development highlight as being of most concern the Western Melanesian countries of PNG, Solomon Islands and Vanuatu with high levels of poverty, relatively low development, high and rapidly growing populations, low employment, weak economies and poor public sector capacity. All the PICTS are highly vulnerable to economic and environmental impacts but this vulnerability combined with high population growth and weak resource bases adds the atoll nations of Kiribati and Nauru to the list of countries of most concern[16].

The socio-economic pressures described above are all taking their toll on the environment, subsistence and commercial activities are impacting forests, agricultural land and fisheries resources. Biodiversity is already paying a price and species extinction rates are reported to be among the highest in the world, particularly for birds[17].

Figure 3. Projected population growth in rural and urban areas of Melanesia, Micronesia and Polynesia to 2030, and the fish needed for future food security (Secretariat for the Pacific Community and Bell et al. 2007).



The future of Pacific Island peoples is inextricably linked to their terrestrial and coastal ecosystems. Unsurprisingly and with the exception of inland populations in Papua New Guinea, a rapidly growing population is reliant on fish as the major source of protein for at least the next 20 years. This reliance seems likely to spark a crisis of considerable proportions in Melanesia where high population growth and predominantly rural populations with few alternatives have projected food requirements well in excess of

16 UNDP 2007, NZAID 2002 based on ADB data

17 McIntyre 2005, Chape 2006

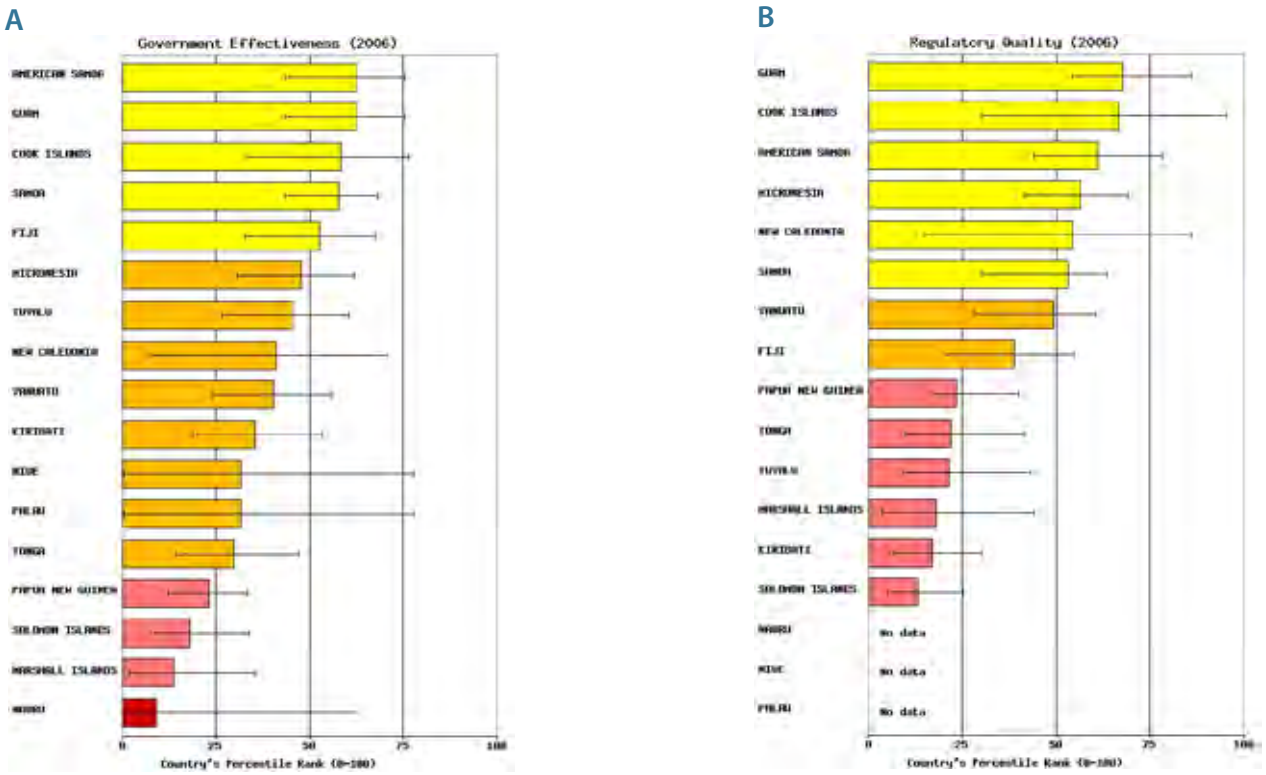
what coastal areas are currently likely to produce without significant improvements in management and productivity[18] (FigFigure 3. Projected population growth in rural and urban areas of Melanesia, Micronesia and Polynesia to 2030, and the fish needed for future food security (Secretariat for the Pacific Community and Bell et al. 2007).

The role played by Pacific Island reef ecosystems, though, extends far beyond that of sustenance or income generation and includes such vital functions as protection from extreme natural phenomena, safe transport and providing a central element of Island society and culture – the very identity of Pacific Islanders[19].

The independent Pacific Island countries have tended to inherit forms of government that are ill suited to their social and geographical realities. The "command and control" approach to policy and regulation often clashes with customary resource tenure prevalent in almost all the PICTs (see below), requires human and financial resources that are beyond the reach of all but the wealthier island nations and turns out to be well nigh impossible to implement through the complex arrays of traditional and modern sectoral institutions.

Though legally empowered to exercise some jurisdiction, the effective control over natural resource use by government ranges from deficient in the more developed countries in the East to practically negligible in Western Melanesia[20]. This situation is reflected in overall governance indicators monitored by the World Bank (FigFigure 4. Governance indicators for Pacific Island Countries and Territories 2006. A. Government effectiveness B. Regulatory quality (Kaufman et al. 2007).

Figure 4. Governance indicators for Pacific Island Countries and Territories 2006. A. Government effectiveness B. Regulatory quality (Kaufman et al. 2007).



The increasing pressure on life supporting ecosystems and the challenges faced by the post-colonial administrations in developing functional resource management strategies has been cause for concern for decades. Pressing issues in other development fields such as health and education have obviously taken

18 See for instance Bell, J. 2007, Commission of the European Communities, 2000, Gillett and Lightfoot 2002 and UNDP 2002.

19 Whittingham et al 2003, Johannes 1981, Hviding 1996

20 Dalzell and Schug 2002, World Bank 2000, Lane 2006a,b,c, Preston 2005, McIntyre 2005,

priority and not without good reason as Melanesian countries' progress on between half to all the Millennium Development Goals is estimated to be "of concern" [21]. But as explored above, increasing reliance by growing populations on ever dwindling natural resources is likely to become critical in Western Melanesia – indeed resource issues appear to have been central to at least two recent national conflicts[22].

Vueti Navakavu LMMA, Fiji Islands[23]

Navakavu Locally Managed Marine Area is located on Fiji's main island of Viti Levu near to the capital city of Suva. The Locally Managed Marine Area (LMMA) was established in 2002 by the clan (yavusa) of Navakavu residing in the four villages of Muaivusu, Nabaka, Waiqanake and Namakala, some 600 people. With support from Institute of Applied Science of the University of the South Pacific and other partners in the Fiji Locally Managed Marine Areas Network, yavusa Navakavu has established a community-based tabu or no-take zone and wider marine managed area under customary traditional authority. Governance and enforcement is undertaken by a committee answerable to the "meeting of chiefs" and decisions are enforced by the community through customary mechanisms and honorary fish wardens. Formal legal support is inadequate and the court system provides no support at all. The community perceives a number of benefits from the project including increased fish stocks in the no-take zone and increased value of the fishery overall. In addition the Vueti Navakavu approach exemplifies traditional stewardship in which caring for the resources is a duty towards future generations.

Community meeting at Navakavu at initiation of project (Credit: S. Meo)

21 AusAID 2008.

22 The unrest in Solomon Islands (1999-2002) seems to have been primarily driven by manipulation of tensions caused by population pressures in Guadalcanal and Malaita Province and access to land. The 2006 military coup in Fiji was partially motivated by controversial proposals for marine resource legislation, the Qoliqoli bill.

23 Prepared by Semisi Meo and Hugh Govan for Govan et al. In press.

RESPONDING TO THE CHALLENGES IN MELANESIA AND POLYNESIA

From the above some of the challenges facing Polynesia and particularly Melanesia include:

- Extremely high population growth and increasing risk of poverty,
- Introduced governance systems poorly suited to national circumstances, and
- Lack of government resources and capacity, particularly for regulatory functions.

These challenges are resulting in increased pressure on natural resources leading to erosion of biodiversity, livelihoods and even conflict. In response, a shift in resource management strategies has occurred over the last decade or so, building on some of the regional strengths highlighted above – diversity, traditional tenure and local governance. This shift towards Community Based Resource Management, particularly in Melanesia and Polynesia is probably unprecedented on a global scale and is the subject of this report.

Customary land and sea tenure – obstacle or opportunity?

With the exception of Tonga between 81-98% of the land in independent Melanesia and Polynesia (TabTable 3. Distribution of land by system of tenure in Melanesia and Polynesia (AusAID 2008).remains under some form of customary tenure and group or individual right of access to land through customary processes still remains one of the main components of ethnic and national identity.

Table 3. Distribution of land by system of tenure in Melanesia and Polynesia (AusAID 2008).

	Public[a]	Freehold[b]	Customary
Cook Islands	Some	Little	95%
Fiji	4%	8%	88%
Niue	1.5%	0%	98.5%
Papua New Guinea	2.5%	0.5%	97%
Samoa	15%	4%	81%
Solomon Islands	8%	5%	87%
Tokelau	1%	1%	98%
Tonga	100%	0%	0%
Tuvalu	5%	<0.1%	95%
Vanuatu	2%	0%	98%

a Includes Crown land and land owned by provincial and local governments.
b Includes land that is not strictly freehold, but similar in characteristics, such as the 'perpetual estates' found in Solomon Islands.

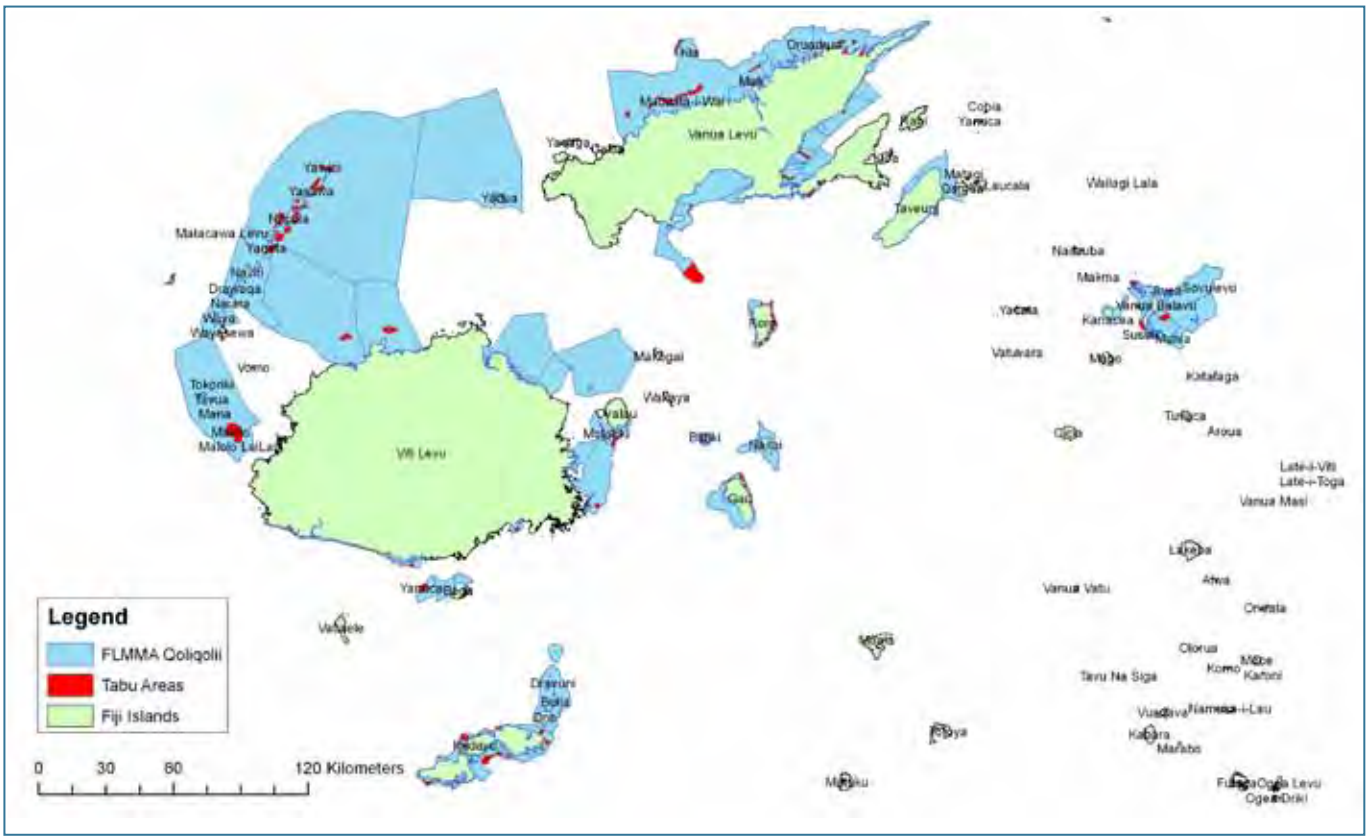
Customary tenure systems vary from group to group and it is important to avoid assumptions based on practices elsewhere. Generally speaking though, the systems are not communal but rather different people or institutions may hold overlapping rights (e.g. travel vs residence/marriage vs extraction) over the same land in a hierarchy of entitlements and obligations which are passed down through the generations (although

other forms of transfer are possible)[24]. In simple terms, customary tenure can be seen as a balance between group and individual rights and obligations, with land ownership being held at group level and land use and resource access being exercised at the individual or household level[25].

Some countries have codified or formally registered customary tenure which provides a basis more suited to meshing with western style land use planning but may have removed some of the flexibility inherent in such systems (e.g. Fijian tenure – Figure Figure 5. Map showing boundaries of traditional fishing grounds, I qoliqoli, in Fiji. The light blue shaded areas denote wider managed areas and darker red denote no-take zones of Community Conserved or Locally Managed Marine Areas (source Fiji Locally Managed Marine Area Network).ortantly, traditional tenure systems are increasingly under external (and sometimes internal pressure) to reform, being seen as a major constraint on economic development by some commentators and donors[26]. In some cases, such as in Vanuatu, recent land reform legislation has fractured customary tenure, whereby large parcels of land, particularly coastal properties are sold to foreign land developers and speculators under lease agreements to the benfit of a single individual or family resulting in a loss of access and use rights for other customary owners or right holders.

The debate regarding the reform of traditional tenure systems has been a long one and may have progressed towards a more conciliatory and negotiated middle ground[27] from earlier but still pervasive positions calling for outright abolition of customary land tenure and their replacement by systems of individual private property rights[28]. However, much of the current debate seems to skip lightly over the potentially grave impact that erosion of traditional tenure systems may have on the environment.

Figure 5. Map showing boundaries of traditional fishing grounds, *I qoliqoli*, in Fiji. The light blue shaded areas denote wider managed areas and darker red denote no-take zones of Community Conserved or Locally Managed Marine Areas (source Fiji Locally Managed Marine Area Network).



24 Ward 1998
25 Fingleton 2005
26 Hughes 2003, 2003
27 AusAID 2008
28 Hughes 2003, 2004

The relationship between people and their land and sea may define among other things the duty of care that people have to each other, the future generations as well as the environment. Such is the case of the *vanua*, in Fiji and similar concepts are to be found in most of the traditional Pacific societies such as *fenua* (Tuvalu), *enua* (Cook Islands) and the *puava* (Marovo, Solomon Islands). These cultural beliefs affect resource allocations and the potential for responsible environmental stewardship of these property rights regimes contrasts markedly with the pitfalls of the western open access approaches[29]. In the absence of western style command and control mechanisms and resources to fund enforcement great care would be warranted before undermining traditional environmental stewardship.

Typically these tenure systems embrace land and sea without western style distinction in the quality of the ownership of either. Customary owners may often have rights over the areas of sea adjacent to their land but in other cases rights may pertain to more distant groups. Definition of seaward boundaries may be equally variable and indeed have evolved, frequently the drop-off or edge of seaward reefs may constitute a boundary but offshore tuna fishing spots for instance may extend boundaries miles seaward[30].

A review of traditional marine resource management in the Pacific Islands (Table 4Table 4. Historical and contemporary legally supported (J) or existence for practical purposes (F) of customary marine tenure (CMT) in the Pacific Islands and evidence for traditional use of closed areas in managing marine resources (Ruddle 1994, Johannes 1978, Kuemlangan 2004)ests that customary marine tenure (CMT) was probably the norm in most coastal communities with the exception of perhaps the relatively few areas where marine resources did not play an important role in life. CMT was the principal and enabling resource management strategy in the Pacific Islands and specific management tools were applied within this context building on these ownership and use rights. Possibly the most prevalent of these tools may have been spatial or temporal prohibitions or bans i.e. closure of access to individual species or marine resources in general in certain areas and/or for defined time periods and/or involving specific technologies – generally grouped under the term "taboo" though the name varies depending on the cultural group[31] (see Box 1).

Box 1. Pacific Island terms describing traditional bans or closures (Govan et al 2008a, Parks and Salafsky 2001)

Cook Islands	*ra'ui*
Fiji	*tabu*
French Polynesia	*rahui*
Hawaii	*kapu*
Marshall Islands	*mo*
New Zealand	*rahui*
Palau	*bul*
Papua New Guinea	*tambu*
Samoa	*sa*
Solomon Islands	*tabu*
Tuvalu	*tapu*
Vanuatu	*tabu*
Tokelau	*lafu*

29 Lal and Keen 2002, Hviding 1996

30 E.g. Zann 1985

31 The word "taboo" has entered the English language from Polynesian roots. In the South Pacific a variety of pronunciations and spellings are used but in this document the English spelling is used unless referring to taboos in a specific country or cultural context.

Table 4. Historical and contemporary legally supported (J) or existence for practical purposes (F) of customary marine tenure (CMT) in the Pacific Islands and evidence for traditional use of closed areas in managing marine resources (Ruddle 1994, Johannes 1978, Kuemlangan 2004)

Region/country/island (country of association)	CMT historical	CMT current	Traditional closures
MELANESIA			
Papua New Guinea	√	F	√
Fiji Islands	√	F/J	√
Solomon Islands	√	F	√
New Caledonia (Fra.)	√	?	?
Vanuatu	√	J	√
POLYNESIA			
French Polynesia (Fra.)	√	?	√
Samoa	√	F	√
Tonga	√	X (1887)	?
American Samoa (U.S.)	√	?	√
Wallis and Futuna (Fra.)	√?	?	√
Cook Islands (N.Z.)	√	F	√
Tuvalu	√	F	√
Niue (N.Z.)	√	√	√
Tokelau (N.Z.)	√	√	√?
Pitcairn Islands (U.K.)	?	?	?
MICRONESIA			
Guam (U.S.)	√?	X	?
Federated States of Micronesia	√	Some	√
Kiribati	√	F	√
Northern Mariana Islands (U.S.)	√	X?	?
Marshall Islands	√	X	√
Palau	√	?	√
Nauru	√	X?	?

A myriad of other resource management practices have been documented, for instance Johannes (1978) lists bans on catching of spawning individuals, limiting quantities of catches, release of a proportion of catch or undersized individuals, banning types of fishing equipment, holding excess catches in enclosures, limits on effort (e.g. number of traps), ban on taking bird or turtle eggs and reserving easily accessible areas or species for times of poor fishing conditions. In fact it would appear that "modern" fisheries management tools can find traditional counterparts in virtually every case.

There are a wide variety of documented motives behind the declaration of traditional bans (or taboos) and other marine resource management practices. Areas, species or seasons may be declared off limits due to

the death of a prominent community member, as part of rituals such as initiation, as sacred sites or for "re-stocking" in preparation for a feast for instance. This variety of motivations has led some to question the existence of an indigenous conservation ethic and indeed, this may have only existed in communities highly dependent on relatively limited resources, those that have previously faced their own carrying capacity and developed cultural forms to regulate use of their environment. However, what is less open to dispute is potential impact of these traditional practices on limiting or reducing pressure on resources. Although respect for such traditional rules may be seriously under threat from the pressures of modernity there appears to be solid basis upon which to construct locally appropriate resource management suitable to the modern context[32].

Traditional and local governance systems

Indicators gathered by the World Bank (Figure 4)Figure 4. Governance indicators for Pacific Island Countries and Territories 2006. A. Government effectiveness B. Regulatory quality (Kaufman et al. 2007).to underscore the poor performance of introduced governance systems which is exacerbated by low budgets and the logistical difficulties of governing small countries composed of far flung island groups. Importantly, these and other indicators measure governance "by government" and while communities and external observers readily share this poor assessment of government performance, the latter tend to ignore the rich and diverse systems still operating at the local level based on traditional governance structures[33].

Indeed in countries such as Solomon Islands, Vanuatu, PNG and Fiji most of the "governance" experienced by the majority of the population is "traditional governance" in some more or less hybridized form. Communities commonly criticize modern governance structures as being top-down, lacking consultation, unresponsive to local needs, bureaucratic and inadequate in managing conflict. Communities acknowledge one of the key roles of government as being in service delivery e.g. education and other development services although this is deemed inadequate in part because of incompatibility with local or traditional governance structures.

Traditional governance, in Melanesia at least, is broadly evolving in an attempt to adapt to change. Communities strongly favour maintaining key features of traditional governance such as transparency, accountability (in that decisions are made locally), relevance and conflict management while also generally supporting the integration of these systems into western governance and providing some safeguards against mal-adaptations of traditional roles under pressure from development (e.g. corruption of chiefs in the face of logging or harvesting interests). One expressed need is for this process of integration to more actively involve local communities in discussing and designing hybrid systems that build on the strengths of each and address some of the weaknesses that have emerged[34].

The fields of natural resource management and conservation have seen the dawning of similar realizations of the need to build on customary tenure and governance as we shall see below.

The "demise" and renaissance of community resource management

The traditional tenure systems and resource management strategies that had been prevailing throughout the region experienced gradual erosion with the increased impact of colonization in the 20th century. The reasons for this loss were multiple and varied from place to place – populations suffered translocations, reduction and expansion, World War 2 (with large armies based and fighting on the, often small, islands) and engaged with (or had imposed) western economic and governance models.

32 Johannes 2002

33 Govan et al. 2005, FSPI 2003

34 FSPI 2003

Western colonial governments, following the pattern established in North America and Europe, commenced establishing national parks and similar categories of protected areas, mainly terrestrial and on state land[35] (Table 5).Table 5. History of protected areas (PAs) and Community Conserved Areas (CCAs) in the Pacific Islands Region (adapted from Axford 2007, Johannes 1978)gh Community Conserved Areas (CCA) continued to exist these were not formally recognized and indeed the tenure systems and local capacity to enforce tenure was eroded to the extent that by 1978 Robert Johannes warned of the "demise of traditional marine conservation methods". The coming of independence to the majority of island nations in the 1970s did not immediately change matters but by the 1980s realization of the ineffectiveness of western approaches to conservation in countries with local tenure and little ability to enforce conservation measures began to dawn.

Table 5. History of protected areas (PAs) and Community Conserved Areas (CCAs) in the Pacific Islands Region (adapted from Axford 2007, Johannes 1978)

	Main developments	Protected areas
→ 1900	Widespread customary tenure and traditional resource management	Taboos, sacred sites, fisheries closures etc. (CCAs)
1900 →	Colonial rule – erosion of traditional systems and first "national" approaches to conservation	CCAs (though in decline) and ~5 terrestrial "state" Protected Areas (PAs)
1950 →	Colonial rule – imposition of terrestrial "Parks" (paper parks)	CCAs in decline or ignored, 17 state PAs almost entirely terrestrial
1960 →	Start of decolonization, western legislative approaches still predominate	11 nature reserves and national parks (state) declared, 1 marine (Kirimati)
1970 →	Most island states attain independence, national approaches to conservation along the western model, consideration of how to deal with customary tenure under this approach e.g Wildlife Management Areas in PNG	70 PAs declared, mainly state designated and 75% terrestrial. Traditional resource management in "demise"
1980 →	Growing awareness of environmental degradation and calls for protected area establishment. Recognition of customary tenure but still generally regarded as obstacle	49 PAs, predominantly state parks and reserves, 30% on customary land mainly in PNG, 5% of area marine.
1990 →	Increasing awareness of importance of community participation, ineffectiveness of 'state' approaches to PAs, shift reflected in large-scale projects supporting incentive driven community based conservation and community participation in some inshore fisheries management approaches.	115 PAs of which half CCAs and a third marine PAs.
2000 →	Refining of approaches to PAs, smaller scale approaches to community based management promoted in Melanesia and Polynesia with predominant emphasis on livelihoods. Micronesia increases establishment of PAs. Large MPAs and substantial international commitments (Fiji, Micronesian Challenge) as well as emerging mega-projects with as yet unclear strategy for CCAs	Proliferation of PAs, in particular marine CCAs numbering in the 100s (Locally Managed Marine Area approach).

The late 1990s saw concerted attempts to utilize the strengths of customary tenure and traditional practices in several major projects resulting in significant numbers of CCAs being established, reintroduced or reinforced in Samoa, Cook Islands and Vanuatu. After something of a false start with large scale Integrated Conservation

35 Axford 2007

and Development approaches, emphasis has increased on locally perceived sustainable livelihoods needs and participatory rural development[36] which has seen existing initiatives strengthened or expanded and the proliferation of others in Fiji, PNG and Solomon Islands in a veritable "Renaissance of community based marine resource management" as Robert Johannes put it in 2002.

Safata MPA, Samoa[37]

Safata MPA is one of two large district-wide Marine Protected Areas established through a lengthy community process which started in 2000. The MPA is managed by the local communities through committees comprising chiefs from each of the 9 villages who ensure that management is carried out in the traditional Samoan way (faasamoa) and respect for Christian values. The MPA programme of the Division of Environment and Conservation and Safata MPA comprises some 63.7 km^2 of which each village has a portion of strict no take reserve following traditional sa or bans which protect over 3 km^2. The community members are encouraged with the apprarent successes in terms of increased fish catches and decreased time spent fishing as well as income from tourists interested in visiting their areas. The MPA committee has recently attracted a small trust fund that will greatly support basic operations.

Western boundary of Safata MPA (Credit: P. Ifopo)

36 Chambers 1992, Govan 1994, 1997

37 Prepared by Pulea Ifopo and Hugh Govan for Govan et al. In press.

THE RENAISSANCE OF COMMUNITY BASED MARINE RESOURCE MANAGEMENT

Before discussing the status of marine managed areas in the region it is important to clarify definitions of locally managed marine areas, community conserved areas and marine protected areas in the context of Pacific Island customary tenure and conservation practices.

Definition of Community Conserved Areas

Indigenous and Community Conserved Areas (ICCAs) have recently been recognized for their actual and potential contribution to global conservation targets. The nomenclature of Community Conserved Areas (CCAs) has already been adopted in the region (e.g. in Vanuatu's Environment Act) and as most countries are "indigenous" the shortened term CCA is used in this report though internationally ICCA is the dominant term. The accepted definition of **ICCAs/CCAs** by Borrini et al (2004) is:

> CCAs are natural and/or modified ecosystems containing significant biodiversity, ecological and cultural values, voluntarily conserved by indigenous, mobile and local communities through customary laws or other effective means. They can include ecosystems with minimum to substantial human influence, as well as cases of continuation, revival or modification of traditional practices or new initiatives taken up by communities in the face of new threats or opportunities.

Three key features are needed in order to define a CCA:

1. **A strong relationship** exists between a given ecosystem, area or species and a specific indigenous or local community concerned about it because of cultural, livelihood-related or other strongly felt reasons.
2. The concerned indigenous or local **community is a major player** in decision making about the management of the ecosystem, area or species? In other words, the community has—*de jure* [i.e. legally] or *de facto* [in practice]— the power to take and enforce the key management decisions.
3. The voluntary management decisions and efforts of the concerned community lead to[38] the **conservation** of habitats, species, ecological functions and associated cultural values regardless of the objectives of management as perceived by the community.

Community Conserved Areas and customary tenure

The first two key features of CCAs are indeed characteristics of the large proportion of terrestrial and marine territory under customary tenure in the independent island countries of the Pacific. In the broadest sense, all areas under customary tenure and for which the inhabitants have that special obligation of stewardship discussed above (typified by the Fijian *vanua*) meet the first two criteria of Community Conserved Areas.

Regarding the third feature, it could be argued that customary stewardship results in "more conservation" than alternative and elsewhere more common tenure systems in which people have a less engrained "duty of care". On the face of it, the argument for the enhanced resources management provided by customary

38 …or, at least, *are well in the process of leading to* the conservation of habitats, species, ecological functions and associated cultural values …

tenure is supported by evidence such as expulsion of poachers, prevention or control of squatters or control of access to natural areas (through fees) commonly experienced in the region.

However, despite the genuine and profound relationship between people and land there are many examples of such areas being exploited unsustainably by their "stewards"[39]. Many factors may be at play here including loss of traditional knowledge about the environment, increasingly efficient and speedy methods in which exploitation or damage can be wrought and new interpretations by traditional decision-makers as to the extent of their traditional rights and obligations in modern scenarios of cash incentives and the ability to be absentee "landlords".

It is important to state that customary tenure has the potential to be an important basis for sound and appropriate systems of resource management **but** that this needs to be more explicitly dealt with in national policy and perhaps provision made to safeguard against some of the weaknesses emerging under modern pressures. In the absence of such guidance, and despite the possibility that many areas under customary tenure may in fact constitute CCAs, it is deemed more prudent for the purposes of this study to consider as CCAs only such areas under customary tenure in which resource management or livelihood objectives have been made explicit and can be deemed to lead to conservation impacts as described in the 3rd factor above.

Definition of Locally Managed Marine Areas and Marine Managed Areas

In 2000 a regional gathering of Pacific Island community members and practitioners coined the phrase **Locally Managed Marine Area (LMMA)** as being the most suited to the types of marine resource management being undertaken or envisaged in the region.

LMMA: An area of nearshore waters and coastal resources that is largely or wholly managed at a local level by the coastal communities, land-owning groups, partner organizations, and/or collaborative government representatives who reside or are based in the immediate area.

The word "local" was chosen over "community" – recognizing that conservation projects are often collaboratively-managed by both the community and the government or some other external body. Also, the words "protection" and "protected" are not used because of acknowledgement that the conservation tool(s) employed within an LMMA may involve a combination of management approaches that include species-specific reserves, temporary or shifting reserves, and/or harvest effort limitations (such as gear or seasonal restrictions)[40] and need not imply a complete ban on resource extraction.

Thus LMMAs should not be confused with the closed or taboo portion of marine area. An LMMA could conceivably be entirely open to extractive use following certain regulations or rules although more normally one or several portions of an LMMA will be permanently or temporarily closed to resource extraction. The use of the term LMMA in this document does not imply membership of the "LMMA network" which has operated in some of the countries since 2001.

The term Marine Managed Area (MMA) has likewise emerged over the last decade with the intention of reducing the implication of complete protection or ban on all extractive activities inherent in the term Marine

39 For example sale of all giant clams on local reefs to Taiwanese fishers/poachers in Govan et al. 1988; Kinch, 2002, in press

40 Parks and Salafsky 2001. Govan et al 2008a

Protected Area[41]. There are a number of definitions of the term MMA but for the purposes of this report the broadest is developed and adopted here without entering into details of permanence or duration[42].

MMA: An area of marine, estuarine, and adjacent terrestrial areas designated using federal, state, territorial, tribal, or local laws or regulations intended to protect, conserve, or otherwise manage a variety of resources and uses.

Definition of Marine Protected Areas

Since 1993 the generally accepted definition of **Marine Protected Area** has been:

"Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment."[43]

With the publication of IUCN's new "Guidelines for Applying Protected Area Management Categories" it is expected that the new definition for Protected Area should supersede and encompass the old definition.

The new definition of **Protected Area** (and therefore **MPA**) is:

A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values

The new guidelines provide opportunities for Pacific Island resource managers to clarify the status of their MMAs and for instance recognition of ICCAs is discussed along with mention of specific examples from the South Pacific (Samoa community fishing reserves)[44].

The guidelines outline and clarify categories of protected area with a wide spectrum of potential management objectives – of most use in the Pacific context may be Category V which could include "The preservation of long-term and sustainable local fishing practices or sustainable coral reef harvesting…" and Category VI which may be "predominantly natural habitats but allow the sustainable collection of particular elements, such as particular food species or small amounts of coral or shells". The authors also open the door to different zones within an MMA being placed under different categories and thus some current closed areas could conceivably be assigned to the most restrictive IUCN categories. In addition, cases where "seasonal, fulltime, temporary or permanent controls are placed on fishing methods and/or access" could qualify as MPAs if they meet the protected area definition.

The guidelines are therefore an opportunity for Pacific Islands to ensure that their efforts towards sustainable resource management qualify as MPAs and therefore towards their international commitments and obligations. However, the phrase that qualifies all categories and modalities of protected area "if they

41 Baird et al. 1999

42 Derived from Baird et al. 1999

43 Kelleher and Kenchington 1992

44 Dudley 2008

meet the protected area definition" provides challenges for IUCN and Pacific Island managers in ensuring a satisfactory outcome. As stated by the authors:

> *Although [the new definition] loses the specific reference to the marine environment, it does ensure a clearer demarcation between conservation focused sites and those where the primary purpose is extractive uses i.e., fisheries management areas. It does not preclude the inclusion of relevant fishery protection zones but they need to be consistent with the new definition to be included as an MPA by IUCN/WCPA-Marine. Thus all areas of the sea that are dedicated in some way to conservation will qualify and for those that do not, there is clarity on how to move forward to achieve formal recognition by IUCN as a MPA.*

One issue that will need further clarification and discussion with Pacific Island stakeholders is the definition of "conservation" to be applied and whether this includes sustainable use which while contemplated by some of the categories is not explicitly addressed in the document. Contentiously, at least in the context of Pacific Island traditional notions of conservation and CCAs which lean towards sustainable use as a prime driver, the application of the principle qualifying protected areas "only those areas where the main objective is conserving nature can be considered protected areas; this can include many areas with other goals as well, at the same level, but in the case of conflict, nature conservation will be the priority". This sits ill with the bulk of Pacific Island CCAs which are periodically opened for harvest or at least have livelihoods as a primary objective as described below.

On the other hand, the Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity (CBD) (Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas) adopted the following definition: "Marine and Coastal Protected Areas mean any defined area within or adjacent to the marine environment, together with its overlying waters and associated flora, fauna, and historical and cultural features, which has been reserved by legislation or other effective means, including customs, with the effect that its marine and/or coastal biodiversity **enjoys a higher level of protection** than its surroundings" (Secretariat of CBD 2004)[45]. If this definition is maintained by the CBD then there may be no issue as it is to the CBD that the main national obligations on MPA coverage pertain.

In the context of the Pacific and the IUCN definitions the main challenges may be:

- **Determining the community's (and thus the site's) main objective,**
- **Reliably differentiating between sites based on these objectives**
- **Reconciling indigenous understanding and definitions of "nature conservation" with those adopted by IUCN**
- **Determining the usefulness of the new IUCN definition compared to the CBD definition in the context of Pacific Island nations and their cultural and national aspirations.**

A note on terrestrial conservation

The following sections focus mainly on marine managed areas as is the remit of the study but also because the bulk of experience and documentation has been generated in coastal and inshore areas. It is important to highlight though that there is an immediate and vital need for community conservation initiatives addressing land to be brought to the fore.

Terrestrial conservation should be addressed along with marine not only because of the particularly acute crisis affecting terrestrial biodiversity in the Pacific but also the impacts on land such as logging and waste are largely uncontrolled and where they occur are likely to be amongst the major threats to inshore marine areas[46].

45 World Bank 2006

46 Watling 2007, Jenkins et al. 2007

Novel and existing approaches urgently need strengthening and while terrestrial conservation may be more difficult to address through community conservation alone, much of the experience generated in coastal areas relating to process, techniques and governance will be invaluable.

An inventory of MMAs in Melanesia and Polynesia

The MMAs of Melanesia and Polynesia have been inventoried on at least two occasions[47] but these studies are out of date owing to the rapid progress of community conservation and the further decline of the "paper parks". The information from these studies has been incorporated (at least partially) in global databases such as World Database on Protected Areas (WDPA – www.unep-wcmc.org/wdpa) and MPAGlobal (www.mpaglobal.org). The global databases provide coverage of officially designated protected areas but no indication of their continued implementation and have not registered the bulk of LMMAs or CCAs, particularly in Melanesia.

A regional inventory of LMMAs has been compiled as a main output of the current study through correspondence with project staff and community members, site visits, and the assistance of national and regional organizations. Data, current up to January 2008, were provided by the WDPA and were used in place of "official" country lists which were lacking in most cases (except Tonga, Cook Islands, New Caledonia and French Polynesia). The summary findings for independent South Pacific countries are presented in Table 6 anTable 6. Inventory of Marine Managed Areas in the South Pacific with emphasis on locally managed marine areas and community conserved areaoverseas territories and associated states in Table 7, country summaries and the complete database are in Annexes 1 and 5.

Table 6. Inventory of Marine Managed Areas in the South Pacific with emphasis on locally managed marine areas and community conserved area

	Cook Islands (NZ)	Fiji	Papua New Guinea	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu	Totals
Protected Areas (WDPA)*	8	45	92	8	22	12	1	26	214
Marine Managed Areas (all records)	39	246	166	84	127	18	10	55	745
Marine Managed Areas "Active" (est.)	24	217	80	54	113	6	4	20	518
Locally managed marine areas	23	217	86	59	113	6	10	44	558
Community Conserved Areas	23	217	79	82	109	0	10	44	564
No-take Zones	24	222	94	82	115	9	3	44	593
MMA coverage, all records (km^2)**	18.9	10,880	3,764	209.1	1,381	10,009	75.6	89.4	26,427
LMMA coverage (km^2)	18.1	10,816	59.4	119.5	941	92.9	75.6	58.1	12,180
No-take Zones (km^2)	18.9	593.0	18.0	15.8	310.5	10.1	50.2	89.4	1,107

* Protected areas with marine component

** Includes 9,916 km2 in Tonga (Ha'apai CA and others), 440 km2 in Solomon Islands (East Rennel World Heritage Area marine component) and some 3,700 km2 in PNG. All deemed to be inactive.

47 Huber and McGregor 2002, Axford 2007

While most of the territories and associated states (Table 7) mainTable 7. Inventory of Marine Managed Areas in South Pacific Territories and Associated States.elatively accurate lists of MMAs which are more or less reflected in the WDPA and other databases, the situation is reversed for the independent countries of the South Pacific.

The official protected area lists (where they exist) and the WDPA data do not accurately reflect the situation on the ground in the independent countries. In terms of numbers these lists usually do not include the majority of the functioning LMMAs or CCAs and conversely do include sites that have been abandoned, degazetted or are proposed. The effectiveness of many of these protected areas is widely questioned but cannot be assessed on the present data. But it is clear that a number of "officially" listed sites which contribute vast areas to national and regional statistics on managed marine area are not in operation, to the extent that users may not even be aware of their existence. Such is the case for the Ha'apai Conservation Area in Tonga[48], the marine area of the East Rennell World Heritage Area in Solomon Islands and a number of sites in PNG[49] which together account for up to 14,000 km^2 or more than half of the independent countries combined total. These figures should therefore not be used in regional computations owing to the risk of vastly overstating the amount of area and habitat under management.

Table 7. Inventory of Marine Managed Areas in South Pacific Territories and Associated States.

	American Samoa	French Polynesia	New Caledonia**	Niue	Tokelau	Wallis and Futuna	Totals
Protected Areas (WDPA)*	19	10	20	3	3	0	55
MMA coverage, all records (km^2)	173.5	2,837	16,188	30.5	0.5	0	19,229
No-take Zones (km^2)	158.8	1,282	445	0.35	?	0	1,886
LMMA coverage (km^2)	>2.6	441	-	0.35	0.5	0	445

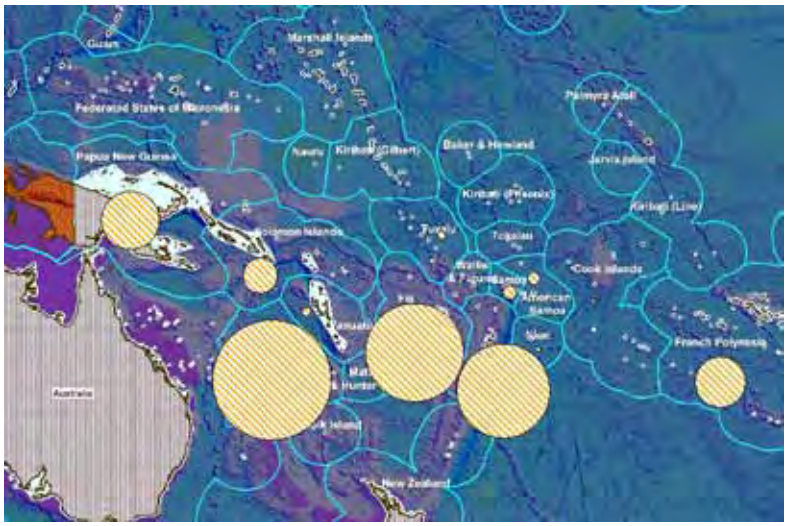
* Protected areas with marine component ** The WDPA suggests 30 sites, the official government list cites 18. The current figure is used (Christophe Chevillon, Pers. Comm. to C. Vieux)

48 AusAID 2007

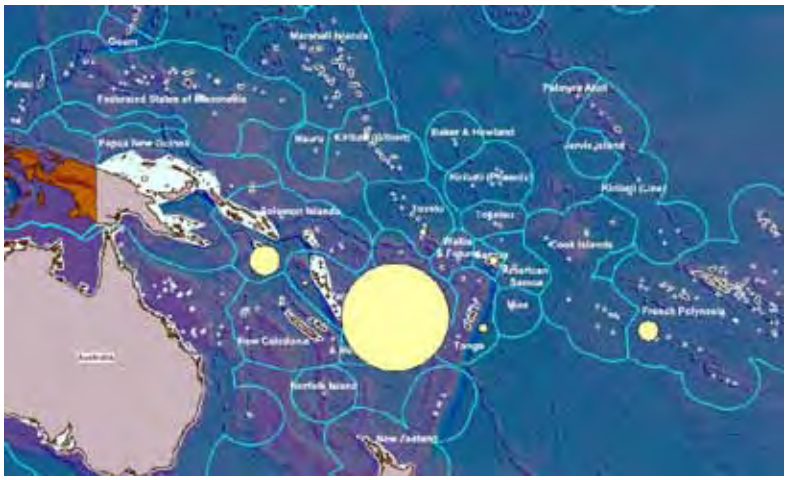
49 Jenkins and Kula 2000

Figure 6. Relative area coverage of Marine Managed Areas in South Pacific countries; A: All recorded areas (WDPA and this study), B: active Locally Managed Marine Areas (this study), C: confirmed no-take zones (this study and WDPA).

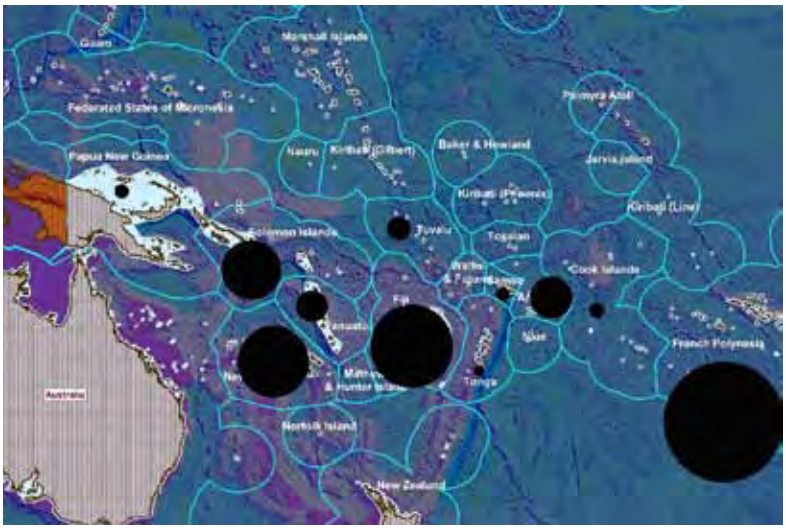
A



B



C



The present study collected information on LMMAs locally acknowledged to the extent that they "enjoy better protection than the surroundings" within the last 3 years. These sites are considered "active" and the same criteria were applied to the available information for WDPA listed sites. For the independent countries all sites deemed operational by national contacts were in effect LMMAs. The coverage provided by LMMAs (in most cases also qualifying as CCAs) contributes the bulk of marine area managed in all countries, in Fiji spectacularly so with over 10,000 km^2 accounting for nearly 90% of the region's total, but also Cook Islands (except for Suwarrow National Park), Samoa, Tuvalu, Solomon Islands and Vanuatu. The datasets for PNG and Vanuatu are grossly deficient and most likely under-represent the true coverage of LMMAs.

The results show that a locally managed approach to protected areas is virtually the only approach to Marine Managed Areas actively pursued at present in the independent countries of the South Pacific. Given the discrepancies detected in global PA databases the figures for LMMAs collected in this inventory provide the best picture of current MMA coverage.

The situation in French and US territories is different and official databases provide a far more accurate picture, but even in those countries considerable attention is paid to stakeholder participation and CCA type approaches do exist to a lesser extent in French Polynesia (rahui) and American Samoa.

Marapa / Niu MPA, Marau, Guadalcanal, Solomon Islands[50]

The Marapa/Niu site, situated within Marau Sound, is about 3.3km long and consists of pristine coral reefs, white sandy beaches, mangrove patches and seagrass beds. Marau Sound is an extensive, picturesque lagoonal system with a variety of reef habitat, sheltered bays and exposed outer reefs at the southeastern tip of Guadalcanal Island. Marau sound has a mixture of peoples from the neighboring province of Malaita who inhabit the islands of the lagoon and mainland Guadalcanal people who live in relative harmony despite the recent conflict between these two provinces. The inhabitants of the 6 communities on the islands or Marapa and Niu are highly dependent on their marine resources and like the rest of the lagoon dwellers have been engaged in improving marine resource management over the last 6 years. Marapa/Niu is the largest of the currently 10 marine CCAs that have been established in the lagoon and illustrates the iterative and adaptive approach that has seen such practices revived and extended to more and more communities in the Pacific.

The MPA and its committee (Credit: Hugo Tafea)

50 Prepared by Hugo Tafea and Hugh Govan for Govan et al. in press.

CURRENT STATUS OF LMMAS IN MELANESIA AND POLYNESIA

Melanesia and Polynesia have seen an impressive increase in the number of conservation and management areas over the last decade. The application of community based coastal resource management is the common thread. Traditional knowledge and resource ownership combined with a local awareness of the need for immediate action are frequently the starting points for these community driven initiatives.

The promising community initiatives such as those found in Fiji, Samoa, Cook Islands and Vanuatu are not based solely on traditional mechanisms, as communities find ways of adapting traditional practices to modern times and integrating community governance in wider national contexts. Communities setting up local management will often, though not always, seek to complement their existing knowledge and skills by asking government and non-government organizations for advice and assistance in interpreting scientific knowledge and implementing planning processes.

Supporting organizations have increased their emphasis on collaborative and participatory approaches in line with the worldwide realization that local aspirations, livelihoods, conservation and inshore fisheries management should be integrated[51]. In many respects the Pacific has taken the lead with hundreds of communities in Fiji, Vanuatu, Solomon Islands, Samoa, Papua New Guinea, Tuvalu, Cook Islands and Micronesia now proactively engaged in managing their coastal resources for a variety of reasons.

Approaches range from the customary or traditional to complex multi-stakeholder co-management[52] involving government agencies and NGOs and are known by as many names as there are sponsors; LMMA, VBRMA, CBRM, CBFM, VFMP[53] to name a few.

Fiji has shown an impressive rate of expansion supported by a national network of NGOs and government organizations promoting "locally managed marine areas" known as FLMMA. More than 200 villages spread across the 14 provinces in Fiji have established some form of community-based management measures and the numbers have increased steadily every year over the last decade. This is due in great part to trickle down or snow-ball effects which has seen skills passed from village to village and requests from interested communities surpassing available support capacity.

Samoa has shown the strongest government investment (originally supported by AusAID) in community based fisheries management that had resulted by the late 1990s in a national network of dozens of village fisheries management areas, some 50 appear to be active today and the numbers remain steady or slowly increasing. Also in Samoa, the Environment Department is supporting more than 20 communities practicing no-take reserves within the two large MPA systems of Aleipata and Safata.

Many communities in Vanuatu have preserved traditional management in the form of 'tabu' areas and in others this tradition has been revived with the support of fisheries officers, other government organizations and NGOs. Some estimates suggest as many as 80 villages actively manage their marine resources in this manner in Vanuatu[54].

Cook Islands has a number of traditional taboos known as *ra'ui* that have been maintained and *ra'ui* were reintroduced on the main island of Rarotonga in 1998, six of which remain at present. Solomon Islands has seen impressive progress in the last few years with currently over 100 NGO supported LMMAs, Tuvalu too is

51 Govan, H. 1997, Whittingham et al. 2003.

52 Johannes 2002, Govan et al. 2006. LMMA 2006. FSPI 2004-2006, Aswani and Hamilton 2004a, Feral 2008

53 Locally Managed Marine Areas, Village Based Resource Management Areas, Community Based Resource Management, Community Based Fisheries Management, Village Fisheries Management Plans.

54 Johannes and Hickey 2002

registering significant gains with communities keen to register or revive local conservation areas. Papua New Guinea has seen progress in the face of considerable challenges with strategies becoming more defined. Initiatives are in the early stages for Tonga which has seen the establishment of 6 special management areas so far under a Fisheries Division nation-wide strategy.

The dependent states and territories are progressing well using more Western style PAs and New Caledonia has recently made impressive progress with the declaration of a massive lagoonal World Heritage Area. American Samoa and French Polynesia are combining traditional resource management and sustainable use approaches with national protected area systems.

Contribution of Marine Managed Areas to international commitments

The signatories to the Convention on Biological Diversity (CBD) including all Pacific Islands Countries, as well as France, New Zealand and Australia, agreed to establish "comprehensive, effectively managed, and ecologically representative national and regional systems" of MPAs by 2012. In 2006, this target was quantified to "at least 10% of each of the world's marine and coastal ecological regions effectively conserved by 2010"[55].

The outputs of the 2003 World Parks Congress (Durban Accord and Durban Action Plan) called for "strictly protected areas" in the marine environment that should cover "at least 20–30% of each habitat" The terms "habitat" and "ecological region" were not formally defined either at the 2003 World Parks Congress or in the CBD outputs, work has progressed in some regions to develop frameworks for marine conservation planning using generalized biogeographic patterns[56].

The Pacific Islands have made various national commitments, in the South Pacific those of Fiji and American Samoa are noteworthy and Samoa and French Polynesia have made 15% commitments in their National Biodiversity Strategies and Action Plans[57]. Fiji committed in 2005 at the 10 Year Review meeting of the Barbados Programme of Action for Small Island Developing State in Mauritius to "by 2020, at least 30% of Fijis inshore & offshore marine areas, (I qoliqoli's) will have come under a "comprehensive, ecologically, representative networks of MPAs, which are effectively managed and financed"[58].

Following the recommendations of the US Coral Reef Task Force that 20% of US coral reefs be covered by no-take MPAs, American Samoa has also committed to developing a network of no-take MPAs with a target of 20% of the territory's coral reef ecosystems by 2010[59].

An immediate challenge facing the region is that, with the possible exception of the two Samoas, it does not appear that international or national commitments have been interpreted in the light of nationally available data on coastal areas, habitats and ecological regions.

For instance in the case of Fiji, with perhaps the best access to data, interpreting the commitments is confusing; the I qoliqoli (traditional fishing grounds) are estimated at 25,588 km^2, inshore marine areas at 156,058 km^2 (25,588 km^2 of internal waters and 130,470 km^2 of archipelagic waters) and offshore marine areas could equate to territorial waters (approx 114,464 km^2) or the whole EEZ (1,260,000 km^2)[60]. Similar clarification may be needed on the ecological and habitat commitments.

The appearance of a new global biogeographic classification, termed marine ecoregions of the world

55 Wood et al. 2008, Benzaken et al. 2007

56 Spalding et al. 2008

57 Benzaken et al. 2007

58 Speech by the Minister of Foreign Affairs & External Trade; Head of delegation to the Review of the BPOA + 10; Hon. Minister Kaliopate Tavola

59 Gombos et al. 2007.

60 Data from K. Tabunakawai and SPC Procfish project (territorial waters using 12NM from coastline)

(MEOW)[61] along with other ecological data-sets recently identified and collated by Bevis Fedder[62] and coastline, continental shelf and EEZ data being collated by the regional organizations SPC and SOPAC should allow progress to be made in interpreting these commitments at national levels. For countries to seriously address international commitments these parameters will need to be defined by the relevant national authorities.

Such a detailed analysis is beyond the scope of the present work but initial comparisons with readily available datasets (Table 8) suggest Table 8. Comparison of inventoried Marine Managed Areas in the South Pacific with available data on coastal and marine extension and estimates of reef area (areas which may have achieved 25% or greater coverage are double underlined and those between 10% –25% are single underlined).iji, New Caledonia and French Polynesia may be on track to meeting their commitments at the inshore or coral reef ecosystem level. However, the situation for other countries is cause for concern and all countries are far from meeting their commitments if "strict protection" is interpreted as "no-take zones". **The region as a whole may be estimated to have just over 30,000 km^2 under MMAs based on figures for the associated states/ territories and LMMA coverage for the independent countries. This represents under 0.2% of the combined EEZ and only Fiji and New Caledonia are within reach of the global average of 1.5% of EEZ protected[63] with 0.8% and 0.9% respectively.** In terms of territorial waters estimates the figures are equally disheartening with a regional average between 3-4% and Fiji and New Caledonia at 10% and 24%. For those countries with estimates of continental shelf the figures are more encouraging with Fiji Islands, French Polynesia, New Caledonia and Samoa all exceeding 35% coverage by MMAs and an overall average of some 14%.

Table 8. Comparison of inventoried Marine Managed Areas in the South Pacific with available data on coastal and marine extension and estimates of reef area (areas which may have achieved 25% or greater coverage are double underlined and those between 10% –25% are single underlined).

	EEZ Area **a**	Territorial waters **b**	Contin-ental shelf area **c**	Inshore Fishing Areas **d**	Reef area (km^2) **e**	Total marine area man-aged (km^2)	LMMA area, all re-cords (km^2)	No-take Zones (km^2) Area
American Samoa	390,000	9,910		530	220	174	3	159
Cook Islands	1,830,000	31,314			1,120	19	18	19
Fiji Islands	1,290,000	114,464	19,497	47,705**	10,020	10,880	10,816	593
French Polynesia	5,030,000	243,885	4,959		6,000	2,837	441	1,282
New Caledonia	1,740,000	68,665	46,257		5,980	16,188	-	445
Niue	390,000	2,983			170	31	0	?
Papua New Guinea	3,120,000	355,699	132,401	191,256	13,840	3,764*	59	18
Samoa	120,000	9,995	584	2,087	490	209	120	16
Solomon Islands	1,340,000	140,038	25,922	36,282	5,750	1,381*	941	311
Tokelau	290,000	6,999			<50	1	1	?
Tonga	700,000	37,526	3,191		1,500	10,009*	93	10
Tuvalu	900,000	18,975			710	76	76	50
Vanuatu	680,000	69,169	13,582	11,483	4,110	89	58	89
Wallis and Futuna	300,000	5,686			940	0	0	0
Totals	18,120,000	1,115,308	>246,393	>289,343	50,900	45,656*	12,625	2,992

a SPC statistics, **b** SPC PROCFish project, **c** WRI, **d** Seas Around Us project, **e** Spalding et al. 2001, * significant over-estimate ** the

61 Spalding et al. 2008
62 Fedder and Govan 2007
63 Benzaken et al. 2007

I qoliqoli (traditional fishing grounds) are estimated at 25,588 km^2

Physical characteristics of LMMAs

Extent of the managed area and no-take zones

Customary tenure offers the potential for community resource management over the bulk of Pacific Island land and coastal waters. In the application of LMMAs around the region many have chosen to concentrate on localized bans, closed areas or taboos. However, the higher area coverage of LMMAs compared to no-take zones for most countries in Table 6 reflects thaTable 6. Inventory of Marine Managed Areas in the South Pacific with emphasis on locally managed marine areas and community conserved areancreasing number of LMMAs are aiming to manage the whole customary fishing ground[64] (and in some cases the terrestrial areas as well) with a variety of rules imposed, usually including a no-take or taboo zone in part of the area. This is a significant move towards realizing the full potential of customary tenure in tackling watershed or ecosystem wide issues.

Size

The areas covered by individual LMMAs vary widely within and across countries, large managed areas include Kia in Solomon Islands, Aleipata and Safata MPA in Samoa, Pere in PNG and Macuata and Yadua Taba in Fiji all of which extend more than 50 km^2, more than 1,000 km^2 in the last two cases. **No-take zones are characteristically small** (Table 9**), the medianTable 9. Size characteristics of no-take zones in Marine Managed Areas in the South Pacific.in most countries is less than 1.0 km^2.** Large no-take zones do exist (e.g. Arnavon MCA in Solomon Islands, Dravuni in Fiji or the Funafuti CA in Tuvalu) although these have experienced significant challenges in enforcement. **It appears that a major feature of no-take zones under LMMAs is their small size probably relating to factors such as ownership, ease of enforcement and reluctance to exclude large areas from livelihood activities.**

Table 9. Size characteristics of no-take zones in Marine Managed Areas in the South Pacific.

No-take Zones (Km^2)	Cook Islands (NZ)	Fiji	Papua New Guinea	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu	Total
Area	18.9	593.0	18.0	15.8	310.5	10.1	50.2	89.4	1,107
Average	1.3	2.6	0.6	0.2	3.3	1.7	16.7	-	
Median	0.9	1.0	0.2	0.1	0.5	1.5	11.8	-	
Maximum	4.1	41.2	6.5	1.1	157.8	2.9	36.0	-	
Minimum	0.04	0.01	0.01	0.01	0.00	0.88	0.02	-	

Recommendations for minimizing risk (for conservation of biodiversity) or maximizing yield (for fishery

64 Kia and Vella Lavella sites supported by WorldFish in Solomon Islands, villages employing rules other than no take zones e.g. Johannes and Hickey 2004 and FSPI 2006 in Vanuatu and Safata and Aleipata MPAs in Samoa.

management) suggest that a minimum of 20% and an optimum of 30–50% of the total management area be set aside in reserves[65]. If the management area is taken to be the national inshore fishing zones then as discussed above almost all countries have major shortfalls in attaining this optimum. Proportions of LMMA set aside as no-take zone could give some indication of the coherence of strategies in place (Table 10). Although cTable 10. Proportion of maximum recorded Marine Managed Area (MMA) and overall locally managed marine area (LMMA) under no-take zones or reserves in the South Pacific (areas in km2).dated figures mask the effects of a few large LMMAs, indications are that the LMMAs in Solomon Islands, PNG and possibly Tonga and Samoa may be moving towards optimum proportions of no-take zone in their strategies. Fiji at 5% of the total LMMA set aside as reserves may be falling short of the recommended optimum if the extent of the LMMAs corresponds with the fishing or management area. For the remaining countries the figures reflect the lack of records for overall managed area rather than relative importance of no-take zones.

Table 10. Proportion of maximum recorded Marine Managed Area (MMA) and overall locally managed marine area (LMMA) under no-take zones or reserves in the South Pacific (areas in km^2).

No-take Zones (Km^2)	Cook Islands (NZ)	Fiji	Papua New Guinea	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu	Total
MMA coverage	18.9	10,880	3,764	209.1	1,381	10,009	75.6	89.4	26,427
LMMA coverage	18.1	10,816	59.4	119.5	941	92.9	75.6	58.1	12,180
No-take Zones	18.9	593.0	18.0	15.8	310.5	10.1	50.2	89.4	1,107
	100%+	5%	0%	8%	22%	0%	66%	100%	4%
	100%+	5%	30%	13%	33%	11%	66%	100%+	9%

Permanence and constancy

Permanence is taken to mean the proposed duration of management, the majority if not all LMMAs tend to designate a specific period for closures, frequently 1-5 years, after which they can be reviewed and potentially extended. Management plans or agreements may be reviewed more regularly and indeed the adaptive management practiced by many sites can lead to changes in rules or locations of closed areas within very short timeframes.

Constancy refers to whether protection is year round, seasonal or rotational. The bulk of no-take zones in LMMAs are occasionally opened for harvest. Cases of permanent closure exist but others are implemented on a periodic basis. Some may be opened for harvest rarely (special occasions such as major feasts) while others may be regularly opened e.g. yearly and others may rotate between open and closed. The constancy of no-take zones in the region may be classified as:

- Year-round closure: permanently closed
- Seasonally opened: opened on specific defined occasions e.g. for harvest during a fish run
- Seasonally closed: closed for specific occasions e.g. spawning event
- Conditional opening: opened responding to specific triggers e.g. stocks recovered or food for feast

65 Halpern and Warner 2003

required but as a default the area is closed

- Rotational: closures cycle between several defined areas

Out of a sample of 81 no-take zones in Solomon Islands, around 54% are reported as permanent, 31% rotational and 15% periodic. However, "permanent" sites may include a section which is periodically opened and "permanent" sites may be opened if circumstances change[66].

Under the above classification the bulk of no-take zones within LMMAs would fall under the category of "conditional opening" though traditional closures in French Polynesia (rahui) and Cook Islands (ra'ui) are often rotational and rotational closures are also being implemented in Solomon Islands.

Networks, clusters and umbrellas

Sub-national networks, umbrellas or clusters

A majority of sites are located in clusters, networks or groupings reflecting in some cases an ecological intent to provide a network of sites but, in the majority, reflecting logistical or political factors making it easier to support sites in relatively close proximity. Examples of such social networks supported at a sub-national level include the PNG-LMMA network which operates for logistical reasons as two regional networks and the move towards decentralized implementation of the FLMMA network in Fiji. This has been pioneered by the Kadavu Yaubula Management Support Team (KYMST) in the province of Kadavu and now being implemented in a similar fashion for other provinces[67]. There are also examples in Fiji, Solomon Islands and Vanuatu[68] of communities picking up or requesting the approach inspired by neighbours' experiences.

National networks

National networking activities are carried out to some extent by government departments and for example the Samoa Fisheries department promotes inter-community exchanges and connects donors and information sources with the end users. All the Melanesian countries have found it useful, if not fundamental, to develop networks or umbrellas to assist in information and experience sharing, capacity building and policy development. Such networks have the support of one or more NGOs and can consist of the more simple coastal management committees promoted by FSPI in Tuvalu or Kiribati (which include main government and NGO stakeholders in occasional updates and joint actions) to the longer running and highly successful FLMMA network, the PNG LMMA network and the Solomon Islands LMMA network (SILMMA). The recent impressive progress of Solomon Islands in developing the institutional basis for LMMAs or inshore fisheries management included joint elaboration of best practice guidelines and agreed principles under government and SILMMA auspices. All these networks depend for their success on contributions or investments in-kind by their NGO and government members.

International and regional networks

The large regional inter-governmental organizations and the big international NGOs operate de facto networks in the region, consisting of member governments in the former case and local offices or affiliates in the latter. Many of the activities are not specifically targeted at support of existing approaches to MMAs and therefore may have peripheral benefits at best, informal discussions at meetings and so on. In a number of cases it is

66 Such as in the 20+ sites in Roviana and Vonavona – S. Aswani pers. comm. Between 80-95% of FLMMA sites supported by IAS in Fiji are estimated to have been opened or likely to be so (R. Vave and J Comley pers. comms.)

67 Tawake 2007

68 FLMMA, FSPI and FSPV

quite surprising how slowly lessons and experiences have permeated within these networks, suggesting that existing mechanisms could be improved or utilized to add value for relatively little additional cost.

The most prominent non-inter-government networks operating in the South Pacific are the Locally Managed Marine Area network and networks operated by large NGOs such as Foundation of the Peoples of the South Pacific – FSPI (Melanesia, Kiribati and Tuvalu), The Nature Conservancy – TNC (Solomon Islands and PNG) and Worldwide Fund for Nature – WWF (PNG, Solomon Island, Fiji, Cook Islands and New Caledonia) amongst their partners and partner communities.

The LMMA network was conceived in 2000 and has operated since then in Fiji, Palau, PNG, Federated States of Micronesia, Indonesia, Philippines and Solomon Islands. More recently a site in Vanuatu has joined and other countries and sites have been involved in a variety of ways including Samoa, Cook Islands, Tuvalu, French Polynesia, Hawaii and New Zealand. The main activities have been formal learning through monitoring following a structured guide, informal learning through exchanges and meetings, training and support of national networks. It is generally accepted that the LMMA network has greatly contributed to the development of MMAs and even the creation of ecological MPA networks in the region[69] and similar impacts can be attributed to the networks of FSPI[70], TNC and WWF.

Ecological MMA networks

The sub-national and some of the national social networks described above appear to be fundamental to implementation of MMAs in the region. Much less experience is available regarding implementation of ecological MMA networks perhaps owing to the fundamental bottom up approach not being too amenable to external planning guidance. Major examples include Macuata, Kubulau and Kadavu in Fiji[71] and Kimbe Bay in PNG[72], each taking different approaches to ecosystem or ecological networking. It is perhaps too early to determine lessons learned from these approaches though it will be interesting to determine the cost/benefit contributions of centralised planning compared to more decentralised and organic approaches to encourage the maximum number of communities to adopt LMMA approaches within national or sub-national support networks.

Drivers of LMMA establishment

The diversity of cultural and physical settings in the Pacific have of course given rise to wide variety of MMAs across Melanesia and Polynesia, even more so as these have been revived or adapted into the context of the new and evolving nations. In an attempt to tease out some of the underlying differences and lessons learned, the LMMA "phenomenon" is examined from the perspective of the drivers both community and external, tenure and governance contexts, and financial support.

Initiator

This refers to the spectrum of internally (locally/community) driven initiatives through externally imposed ones. Assessing who is driving community based conservation initiatives has important implications in terms of the sorts of results to be expected and the likelihood of initiatives being sustained[73]. Classified from internally generated to more externally initiated we may distinguish amongst the LMMAs in Melanesia and Polynesia the following broad categories:

69 Rowe 2007, UNEP-WCMC 2008

70 Kinch 2006

71 Jenkins 2008, Tawake 2007

72 Green et al. 2007

73 Seymour 1994, Govan 1997

1. **Sacred areas**: Sacred areas still survive in some areas. These are perhaps the most "internally" driven of all in that in many cases they are considered secret or at least sensitive information. Community members may not necessarily associate these areas with "resource management" and may not count them locally as CCAs even though they may well be the most respected of all restricted areas. Inventories of such areas do not appear to exist and given the sensitivities no concerted attempt to inventory them was undertaken in this study though personal observations and communications confirm their existence in Guadalcanal, Malaita, Gela and Shortland Islands in Solomon Islands, New Ireland, Manus Province and the Lihir group of PNG[74]. It is important to point out too that many such sites are no longer locally respected and this may be a continuing trend.
2. **Taboos**: Closures or bans go under a variety of names (Box 1) and were probably traditionally used in all areas where communities depended on marine resources. These taboos can apply to specific areas, species, seasons or fishing methods and are usually for a determined time period. Such taboos were and to some extent are still imposed for important events such as the death of an important person in the community or clan, circumcision and other local rituals and in preparation for important feasts or events[75]. An extreme taboo would be that of the sacred areas mentioned above which were usually permanent but other taboos or bans are much more flexible. Although taboos imposed in the traditional manner still occur in Vanuatu, the outer islands of the Cook Islands, Fiji, Solomon Islands and PNG for example, taboos are increasingly externally driven, either as a reaction to outside pressures on resources, as part of cultural revival movements or indeed as a more or less appropriate translation of western resource management concepts and particularly the Marine Protected Area (MPA). In some if not many cases the initiator may thus be an external agency, commonly a Big International NGO (BINGO). The mismatch between western concepts of MPA and the local perception of taboo raises various important issues highlighted in Table 11.
3. **"MPAs"**: The tTable 11. Generalized differences between MPAs and taboo areas.A is now increasingly used by communities. This is often a sign of external "environmental awareness" programmes or indeed projects and usually lends itself to community interpretation that there is something more to be expected than just the benefits that might be expected from a traditional ban. Whether or not these expectations are justified or realistic, they may include increased "tourism", alternative livelihood projects or other spin-offs from outsiders such as accommodation payments or sales of handicrafts. While some MPAs may be set integrating traditional bans or no-take zones and local governance (e.g. Safata MPA in Samoa) others may be extremely reliant on outside interventions and indeed be hard to sustain after the intervention has finished[76]. In a number of cases communities are directly offered incentives in exchange for creating a no-take reserve or MPA.
4. **Western style parks, conservation and protected areas**: some of the older protected areas may have been established in relatively top-down and extremely externally driven ways. Those that are still active are likely to have invested considerable resources in attempting to increase community involvement with varying degrees of success or cost effectiveness.

An important correlation is self-evident, the more externally driven the initiative the more the costs in financial terms are borne by external agencies and the less these are borne (in transaction costs and social capital) by the local communities. Therefore the distinctions made above are likely to have profound effects on the sustainability of the approaches.

74 Pers. Observation, pers. comms: Hugo Tafea, Simon Foale, Warwick Nash, Daniel Afzal

75 e.g. the Vanuatu case documented by Hickey 2006

76 cf. 2 large regional projects Aitaro et al. 2007, Baines et al 2002 and a large national one Baines et al. 2006

Table 11. Generalized differences between MPAs and taboo areas.

	MPA	Taboo area
Duration	Permanent	Limited or periodically harvested
Size	Small to large	Usually small
Purpose	Biodiversity protection or multiple	Resource management or food security
Governance	Legislation	Individual, clan or community recognition
Enforcement	External assistance	Local
Design considerations	Mainly technical / biological	Mainly social or practical
Perceived analogy	Investment generating bank account – "spillover"	Savings bank accessed when needed – "piggy bank"

Table 11 illustrates the Table 11. Generalized differences between MPAs and taboo areas.ially large differences between the western and local perceptions of closed areas. Despite the words MPA and taboo often being interchanged there are fundamental differences likely to impact on their acceptability by the local population and also their ecological function. **Given the increasing success in reviving the traditional taboo it is important that researchers and planners consider how the specificities of the system can best be supported in achieving wider national and global strategies e.g. the best use of small and periodically opened reserves.**

Motivation of support institutions

The renaissance of community based resource management in the Pacific has been supported or actively promoted by a variety of institutions varying from local communities themselves, government and a variety of non government organizations and initiatives. Traditional and local initiatives may have a variety of motivations as touched on above but the active support of particular external institutions has up until recently defined the approach taken and in many ways the outcomes.

The motivation of external support institutions can be broadly categorized as:

1. **Fisheries development and management**: Some of the early programmes that resulted in the creation of LMMAs were promoted by national fisheries departments, notably those of Vanuatu and Samoa. Both resulted in dozens of LMMAs with primary fisheries management objectives, many of which continue to this day. Recently an NGO with a focus on fisheries management has started supporting establishment of LMMAs in Solomon Islands as have government projects in Tonga and PNG.
2. **Conservation**: Undoubtedly the biggest financial investment in the creation of CCAs has been carried out with funds earmarked for conservation via international conservation NGOs, regional intergovernmental organizations and to a lesser extent national NGOs. A notable exception is the case of the Safata and Aleipata MPAs supported by the Samoan Ministry of Natural Resources and Environment.
3. **Community development:** A number of national (and at least one regional) community development NGOs have been successful in raising funds, often from conservation sources to promote LMMAs as part of community sustainable livelihood or good governance strategies. Other organizations include the regional university and a church have been instrumental in driving at least two networks of LMMAs.

Experience over the last decade has led to a shift of emphasis and blurring of the above distinctions. The realization that community needs are a vital driver has seen a greater integration of community development, conservation and wise fisheries management as a primary sustainable livelihood strategy in the discourse of support institutions.

Community engagement approaches used

The initiators or supporters of LMMA establishment may engage with communities through formal and informal meetings as, for example, in the cases of Vanuatu Fisheries Department and the Cook Islands approaches in the 1990s. Other approaches may be based on long term engagement with communities and careful embedding of the process in local institutions such as in Roviana, Solomon Islands[77]. Perhaps the bulk of community engagement strategies have moved from the original "environmental awareness" or "preaching conservation[78]" approaches towards incorporation of participatory methodologies using graphic tools to facilitate more inclusive discussion and analysis.

A widely adopted approach stems from the Samoa Village Based Fisheries Management Program which was used in Samoa[79] and has since been adapted for use in PNG[80], Tonga and to a lesser extent Solomon Islands, Tuvalu and other pilot sites[81]. The approaches places emphasis on good process and respect for traditional organization. Tools used include awareness campaigns and participatory planning to facilitate community problem and solution analysis and, ultimately, the elaboration and agreement of a community fisheries management plan overseen by a Fisheries Management Committee. Specific management solutions are not promoted but rather tailored to meet identified problems and ongoing review or evaluation of plan implementation are encouraged over other sorts of monitoring.

Another widely applied approach is based on Participatory Rural Appraisal (PRA/PLA)[82]. PRA tools were developed in a number of marine resource management contexts[83] and with the objective of empowering communities to manage their own resources were trialed and subsequently widely adopted in Fiji[84]. These or similar PRA tools have been widely applied or adapted in Solomon Islands[85], Tuvalu, PNG[86] and other countries. The approach uses a suite of participatory analysis and planning tools to facilitate a process of situation analysis, problem identification, awareness and information generation, and community planning leading to management or action plans. No assumptions are made about optimum institutional structure and as part of a general adaptive management framework the need for monitoring is raised and often promoted. The incorporation of traditional knowledge occurs within the context of each tool used but may also be highlighted in specifically tailored tools.

The widespread application of PRA based methodologies has provided approaches that are readily adaptable to a variety of contexts and application by field teams from varying backgrounds. These methodologies have played a fundamental role in the rapid expansion of LMMAs in Fiji and elsewhere but as is to be expected some significant misapplications appear to be emerging.

While in all cultural contexts the involvement of all resource users is important in achieving self-enforcement

77 Aswani and Hamilton 2004a
78 Van Helden 2005
79 King and Lambeth 2000
80 Lambeth and Watt 2004
81 http://www.spc.int/Coastfish/Sections/Community/management_initiatives.htm
82 Chambers 1992
83 E.g. Parks 1997
84 Govan 1999a,b, Govan et al. 2008a
85 Bruno Manele unpublished participatory tools for MPAs
86 Lipsett-Moore et al. 2006

of community agreed restrictions on resource use, this is nowhere more crucial than in Western Melanesia. The more structured and hierarchical societies of Polynesia, and to some extent Fiji[87], may be able to rely on respect for community leaders to secure enforcement of plans but this is not a sufficient basis in the rest of Melanesia or elsewhere where community leadership is being eroded.

Community ownership of LMMA projects is vital to secure sustainability of processes and ultimately of natural resources, this ownership is being reduced through:

- Inadequate involvement of appropriate stakeholders: The complexities of tenureship and community power structures as well as the interests of individual fishermen are sometimes not taken into account. Those stakeholders not involved in planning may feel antagonistic to the "community plans" and at the very least not respect them – this is often reported as "lack of awareness" or "enforcement problems" when in fact it relates more to lack of involvement or "process ownership". In the absence of in-depth understanding of stakeholder structures, attempting to involve the entire community has shown to be a worthwhile approach.
- Adoption (some times inadvertent) of "external" decision making or planning mechanisms: The feeling of process ownership by crucial sectors of the community (often heavy resource users or decision makers) can be reduced through the use of inappropriate committees or representative structures. Another increasingly common erosion of "ownership" is appearing in the elaboration of detailed "management plans" often external to the community and that little resemble the original community agreements. Many sites in Melanesia have found that one page action plans and matrices with the original community wording command more local respect than externally developed wordy documents.
- Time constraints: The complexity of tenure and other social arrangements such as clan or family ownership of reef resources, holding of resource rights by external stakeholders (e.g. through marriage) and so on require extended processes of discussion and consultation long after externally facilitated workshops are over. Sometimes processes are carried forward with little time allowance due to project and donor pressures.

Western Melanesia would benefit from a substantial review of the participatory approaches being used to help adapt them from their more Polynesian origins to the local contexts. Some early experiences from PNG would be expected to make valuable contributions such as the approaches developed by the Bismarck Ramu Group in promoting Wildlife Management Areas in the late 1990s. Through trial and error the BRG community facilitators developed approaches that used PRA but also informal 'storying' and the allocation of sufficient time and appropriate process[88]. It seems that much of this learning process is being repeated (in PNG at least).

Tenure, institutional and governance contexts

Tenure systems

The importance and diversity of tenure systems has been highlighted above as underlying all LMMAs but to some extent the issue of tenure has been inadequately addressed. For instance, though a number of guidebooks provide useful approaches, tools and techniques for supporting LMMAs little of substance is provided on this topic[89]. One main reason is that owing to the cultural diversity it is difficult to generalize, particularly when the bulk of the recent LMMA work has been undertaken in Samoa and Fiji.

87 But see Sano 2008

88 Van Helden 2005

89 King and Lambeth 2000, Lambeth and Watt 2004, Mahanty and Stacey 2004, Govan et al 2008a

At the risk of over-simplification it appears that the marine tenure and governance systems of Polynesia and Fiji are more compatible with simple, rapid resource planning and particularly the setting of taboos. In these countries marine tenure or rights reside to a great extent at the village or district level which, combined with the more powerful role of chiefs, greatly facilitates area planning activities and the closure of particular reef areas.

Marine tenure in Western Melanesia is generally far more complex with systems of rights frequently devolving to the family or clan level[90]. In effect this means that a number of issues are likely to arise that complicate wider resource management, common ones include:

- A specific reef targeted for closure may be the property of one clan, may indeed represent the bulk of their marine area and thus the individual cost to them of the closure is not matched by the wider biological benefits to the rest of the community.
- The challenge of coordinating multiple rights-holders in the formation of larger closed areas tends to lead to smaller closures which may not have biologically significant impacts[91].
- The difficulty of enforcing local decisions on people who retain rights of use but may not be resident in the community (through emigration or marriage for example). This only appears to have been systematically addressed in one LMMA project[92].
- The need to consult more widely and over longer periods of time to ensure consensus amongst a variety of rights-holders without which consensus enforcement may be impossible.

There is clearly a need for more guidance and support to practitioners working in Western Melanesia to assist in dealing with marine tenure issues. This is all the more important given the inherent flexible nature of CMT and the challenges this presents in the face of market led development in terms of potential corruption or ambitious/inappropriate claims to rights and resources not contemplated traditionally.

Traditional knowledge

The approach taken in a majority of cases addresses the incorporation of traditional knowledge under the assumption that a bottom-up participatory process will allow important local factors including traditional knowledge to be brought into the planning process by the participants. This assumption seems valid to a certain extent. In some cases the identification of important aspects of traditional knowledge may be structured into participatory tools (e.g. spawning sites in community resource maps) but it will be important to ensure that issues and lessons learned are debated at national level to ensure that the optimum use of traditional knowledge is being made and both strengths and weaknesses identified.

Legal framework

CCAs are recognised and supported under the Environmental Management and Conservation Act, 2002 in Vanuatu and the recognition of terrestrial CCAs is apparent in the Wildlife Management Act of PNG. In neither of these two cases does the legislation appear to effectively enable CCAs nor appears encouraging enough for communities to make use of it although in the case of PNG this may be due to lengthy bureaucratic processes involved. Instead throughout the region CCAs/LMMAs are reliant primarily on the implicit acceptance of customary tenure and the traditional authority of resource owners. Where support is necessary various other legal mechanisms are employed such as village by-laws in Samoa, fisheries legislation (e.g. Vanuatu and Fiji) and respect for the traditional authority of chiefs such as in Rarotonga, Cook Islands[93] (see Annex 3).

90 See Hviding 1996, Hickey 2006, Aswani and Hamilton 2004b for examples

91 E.g. Foale and Manele 2004

92 Aswani and Hamilton 2004a

93 Fa'asili and Taua 2001, Troniak this report, Tiraa 2006

In many cases the Fisheries Legislation is more suited to supporting CCAs given the resource management objectives of most of these sites and for instance in Vanuatu there is some degree of mismatch or even contradiction between the Fisheries and Environmental legislation.

Vanuatu has an Environmental Registry which contains information on CCAs and other protected areas (though this has not been sighted) but it is not clear that such a registry is kept or updated in any of the countries covered by this study with the possible exception of the draft Assessment of the Effectiveness of Papua New Guinea's Protected Areas[94]. This and other short-comings of the environmental legislation most likely reflect the dire lack of resources of the Environment Departments in the region.

Reviews have been undertaken of environmental legislation in Solomon Islands[95] and such reviews are ongoing in other countries such as Fiji[96], PNG[97], and Vanuatu[98]. Solomon Islands is currently reviewing Fisheries Legislation and is explicitly making provision for community managed areas. Fiji too is long overdue for an overhaul of fisheries legislation but the move to enhance the role of communities in such legislation is currently on hold owing to the political events of 2006.

More attention needs to be paid to coordinating or integrating Fisheries and other Environmental legislation. Given the lack of resources of government departments, the considerable overlap between their remits, the reliance that the region is placing on LMMAs to achieve international commitments and the sustainable use emphasis of the majority of LMMAs it will be vital that any review of either legislation take into account the other. Indeed, integrated legislation dealing with local and community resource management would appear a logical step given recent moves towards Ecosystem Approaches to management and commitments to Integrated Coastal Management.

Consideration must also be given to the arguments made above regarding the usefulness of developing legislation that will be too costly to enforce, produce hurdles or bottlenecks hard for communities to surmount, that may undermine traditional authority and strengths or not have the flexibility of traditional systems.

Role of legislation

The distinct approaches being taken across the region are discovering or developing very different roles for national or local legal frameworks. In essence most cases are situated somewhere on the spectrum between two extremes:

1. Communities are not interested or actively averse to developing formal legal mechanisms to support their management of the LMMA. The reasons and rationale for this may include:

- Little chance that such legalization (gazettal, by-laws, acts, provincial resource management orders) will result in any actual enforcement benefits
- Complex, slow, bureaucratic or even costly processes
- Poor match of the existing legal structures to the actual needs of the community
- Fear that the such formal state or provincial involvement will impinge on local resource rights or even ownership
- Fear that the results will be less flexible than the entirely community driven approach, for instance for rotating or opening a closed area or changing management objectives

94 Chatterton et al. In press

95 Healy 2006, Lane 2006c, McDonald 2006

96 Lane 2006a, Clarke in prep.

97 CELCOR 2008, Van Helden 2005

98 Lane 2006b

2. Communities actively seek supporting legislation such as byelaws or gazettal. The reasons and rationale for this may include:

- Support the traditional system, especially for the most serious infringements
- Provide more authoritarian or rigid support for the enforcement of rules within the community (possibly avoiding some traditional negotiation or obligations)
- Provide a tool to enforce rules on community outsiders not necessarily subject to local traditional authority
- Belief that they may obligate government to provide more enforcement
- Belief that it may highlight the community initiatives and attract outside support (projects, tourism etc)
- Complies with modern legal and governance precepts

In reality of course the debate at community level is somewhere between these two positions. Melanesian countries, particularly Solomon Islands, Vanuatu and Fiji tend to be making little use of existing legal structures while Polynesian countries such as Samoa have integrated development of by-laws into the recommended processes for supporting LMMAs[99]. This situation reflects the disparities in governance, chiefly systems and government capacity for enforcement highlighted above.

The debate on this matter is lively and should be pursued further, on the one hand raising community expectations as to the potential role of governments and court systems which are patently over-stretched already is likely to demotivate communities in the long term and on the other hand, effective means to support community enforcement particularly in the face of poaching from outsiders are urgently needed as the success of these closures attracts the attention of commercial and neighbouring fishers (but see Box 2).

Box 2. Two kinds of poaching in LMMAs.

Poaching is frequently cited as one of the major problems in LMMAs. The nature of the problem can be more readily addressed, or at least understood, if a key distinction is made and motives understood:

Poaching by community members: Solutions may include improving participatory processes, open stakeholder meetings and traditional conflict management.

Poaching by "outsiders": Solutions may include wider integrated management, establishment of LMMAs in poachers' own territory, multi-stakeholder approaches or legal enforcement.

99 cf. Fa'asili and Taua. 2001

Are LMMAs working?

Quantifying the success of CCAs and more recently LMMAs is perhaps one of the most interesting and hotly disputed issues. The topic has spawned multiple publications, at least one Ph.D. thesis[100] but is far from being resolved despite relatively large investments in monitoring.

To gain perspective on this question some of the key questions need to be addressed:

- Who is asking?
- What are they trying to achieve?
- What are the actual or perceived outcomes?
- How can it be measured?

Key players

A crucial distinction is between "outsiders" and "insiders" but neither constitute homogenous groupings. The outsiders have been classified on the one hand as donors and international NGOs more interested in broader issues of conservation and sustainability while the more locally focused group of local NGOs, government and local staff maybe more interested in the details of delivering to communities[101].

The "insiders" may comprise a variety of stakeholders such as local government, commercial fishermen, tourism operators and communities. Communities themselves are far from homogenous and while they tend to form a more cohesive grouping in the South Pacific than in the more developed neighbouring countries there are a diversity of often hierarchical members with complex relationships and considerable variations in status, power and potential access to benefits. The particular composition and dynamics of communities is an immense and highly varied topic, beyond the scope of the current work, but accommodating these particularities is crucial to the approaches being used and accounts for much of the variation in approaches being used between countries.

In discussions relating to success of LMMAs it is therefore vital to identify first whose objectives are being evaluated. LMMA approaches depend fundamentally on community action and therefore understanding their objectives and motivations (explicit and implicit) becomes vital. Perhaps even more importantly, sustained community intervention can be expected to depend mostly on whether benefits to communities (or more accurately key stakeholders in communities) outweigh the costs (opportunity costs[102]) even if these benefits were not originally intended or made explicit.

Purpose

Communities generally speaking have livelihoods as a major priority in setting up LMMAs, which are usually aimed at restoring or securing food sources. Conservation purposes are expressed in some cases but it is not clear that these constitute prime or sufficient community motivation, assessing this is obscured by local understanding or perception that outsiders are specifically interested in supporting conservation initiatives i.e. that this is the answer they want to hear.

100 Axford 2007

101 Axford et al. 2008

102 Lal and Keen 2002

Table 12. Some published management objectives for LMMAs in the South Pacific region.

Site	Objectives	Reference
Zinoa MCA, Solomon Islands	1. To allow populations of commercially-important marine invertebrates and food fish to recover. 2. To preserve the marine populations inside the Zinoa MCA as a 'breeding stock' of macroinvertebrates and food fish that provides 'spillover' of juveniles and adults to adjacent fished sites. 3. Conserve the marine biodiversity of the Zinoa Islands.	Hamilton et al. 2007
Arnavon Marine Conservation Area, Solomon Islands	1. To protect the nesting ground and rookery of the Hawksbill and other sea turtles in the Arnavon Islands. 2. To provide a model for the management and sustainable use of natural resources, both marine and terrestrial. 3. To monitor and evaluate the status of resources and the effects of the management program on those resources, which could then be useful in the broader context of marine and terrestrial resource management. 4. To involve the local communities in the planning, establishment, management and monitoring process for the Conservation Area.	ACMCA Management Committee, 2002
Surveys of up to 21 villages, Vanuatu	Enhancing, preserving or protecting marine resources, financing village development, protecting spawning fish and providing a source of occasional income.	Anderson and Mees 1999, Johannes and Hickey 2004
Paunagisu Village MPA, Vanuatu	Increase number of fish and invertebrates. Protect mangroves, coral and sand. Attract more tourists. Manage waste and sewage. Legal support for village tabu, improve enforcement and awareness. Harvest tabu area when fish are plentiful	Community PLA report, Paunagisu, 2006. Unpublished
Surveys of 6 Fijian villages	Conservation of the fishery resource, raising funds for the community, ceremonial purposes, and the closure of traditional fishing grounds to non-native fishers (Indo-Fijian)	Anderson and Mees 1999
'Atata Special Management Area, Tonga	The aim is to ensure there are fish for our children in the future. To manage and protect the inshore area to help increase the amount of resources To restore and improve marine resources within the Special Management Area	Siola'a Malimali, pers. Comm..
Aroko/Muri Ra'ui, Cook Islands	Most communities see the Ra'ui as a way of replenishing stock and when needed the village can harvest according to a predetermined quota per household. Increasingly there is the growing recognition of the benefits of having Ra'ui for tourism as well.	S. George, M. Matepi pers. comms.
Safata MPA, Samoa	Vision: Commit to taking care of our marine environment and establishing a solid foundation for our Marine Protected Area, which we hope will both sustain and bring new opportunities for our people and future generations. [Goals include: Culture, (Christianity and Samoan way), Fisheries & Biodiversity/ mangroves, Aquaculture, Tourism, Education/awareness]	Safata Management Plan, unpublished.

Pere Environment and Conservation Area, Manus, PNG	1: Increase the abundance of target fish and invertebrate species within the inshore protected reefs within the next 5 years. 2: Increase and maintain the health of coral reef habitats within the Pere Management area within the next 5 years 3: By the end of the year 2009, the number of incidents of coral reef breaking and harvesting would have been reduced to 50% of previous observations. 4: In 2 years time, stop illegal entry of outsiders harvesting local marine resources in Pere Management area. 5: To ensure that tourism activities benefits all local resource owners by 2008. 6: Eliminating disposing of non-biodegradable products in the marine area to zero and by 50% on the land in a year's time.	Pere Community 2008
Sinub, Tab, Tabad and Laugum WMAs, Madang, PNG	To provide refuge for marine life and habitats, to manage fisheries and to restock fish populations. They provide an important function for food security in Madang Lagoon.	Wetlands International et al. No date.

The objectives of MMAs are frequently made explicit in project documentation or management plans which are sometimes published, though more frequently by NGO supported sites than others. A sample of such objectives from around the region is given in Table 12. Community objecTable 12. Some published management objectives for LMMAs in the South Pacific region.tend to revolve around fishery management and livelihood issues and it appears that biodiversity or species specific conservation objectives are mentioned more frequently in more top-down or externally driven MMAs. The 170 Fiji LMMA sites surveyed during the course of this work by University of the South Pacific – Institute of Applied Sciences (USP-IAS) staff reported that the primary goal of management in 44% was "fisheries management", 14% "conservation" and at 42% "both". The main objectives reported for most sites related to quality of life, threat reduction, food security, economic security and income generation.

It also has to be borne in mind that written management or action plans are in themselves a symptom of outside support and intervention and that the implicit objectives for communities (or some members) may well be very different.

For instance, some implicit objectives recorded in village surveys in Vanuatu include[103]:

- Prevent access to neighbouring village
- Restrict access of immigrant community
- Protect source of income for custom owners
- Establish property rights to reef/land areas

It is likely that these implicit objectives play an important role and in particular the (re-) enforcement of property rights and/or exclusion of resource extraction enterprises or other users (such as non-native fishers in the Fijian case mentioned in Table 12). An extreme exaTable 12. Some published management objectives for LMMAs in the South Pacific region.f this may be recent moves by some communities in French Polynesia to reinstate traditional bans or *rahui* but with the stated intention of closing access only to "outsiders"[104].

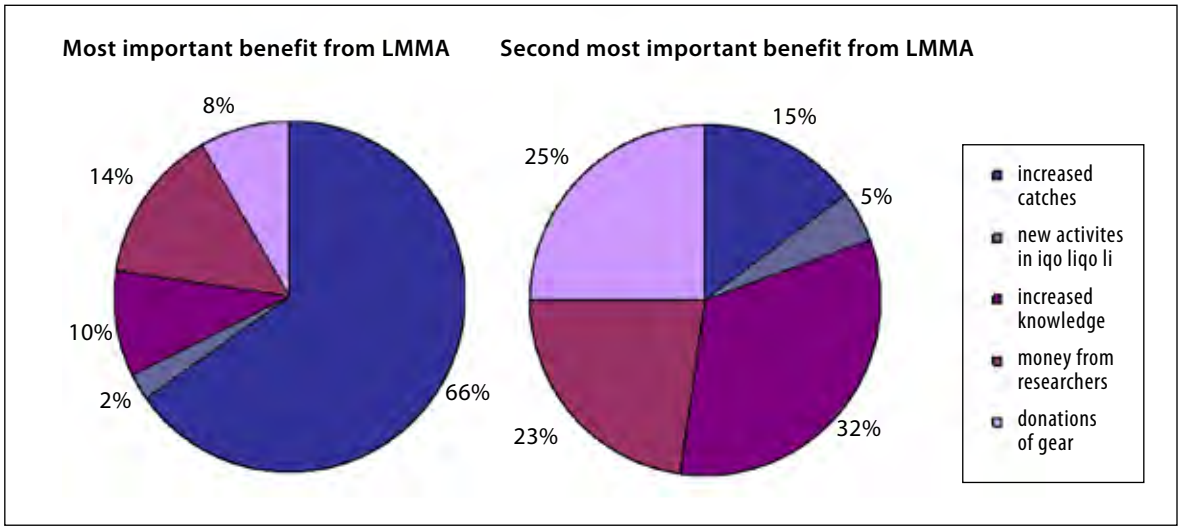
A survey of the Navukavu site in Fiji, which has a community management plan focused on livelihood benefits, found that respondents assigned a relatively high value attached to preserving the ecosystem for

103 Anderson and Mees 1999

104 Miri Tatarata Pers. Comm.. 2008

use by future generations, independent of their own use of the ecosystem (bequest value). This was identified by most respondents (78.2%) as the main motivation for protecting the marine resource. The bequest value was estimated to be equivalent to nearly 7% of household income. This may reflect the "duty of care" that the relationship between the people and land in the *vanua* situation entails[105] and may be one of the first quantitative valuations of an "indigenous conservation ethic" in the region.

Figure 7. Benefits reported by households from Navakavu LMMA (O'Garra 2007a)



Interestingly, the results of the same survey highlight another important issue. The most important benefits of their LMMA given by respondents from households at Navakavu were 1. Increased catches, 2. Increased knowledge, 3. Money from researchers and 4. Donations of gear (Figure 7). This particulaFigure 7. Benefits reported by households from Navakavu LMMA (O'Garra 2007a)is close to Suva and receives much attention from researchers but the impact of money and equipment that "spin-off" from researchers may be significant motivations and benefits in many of the more heavily supported or "researched" sites.

Benefits or outcomes

Monitoring and surveys have been carried out at many LMMAs but for the majority it is hard to assess success or benefits reliably based on these data (see section on monitoring below). It appears that the impacts or "benefits" of a LMMA at any one site are multiple and varied. The following benefits have been variously reported:

- **Biodiversity conservation**: localized recovery or protection of vulnerable species such as large food fish or marine turtles[106] (see Table 13 and Table 14).
- **ImTable 13. Reported impacts of LMMAs on biodiversity and fisheries stocks in LMMAs of Western Melanesia. fishery landings**: experiences from within the region and nearby Philippines show that, depending on species, catches may be sustained or increased[107] (see Table 13 and Table 14).
- **GoTable 13. Reported impacts of LMMAs on biodiversity and fisheries stocks in LMMAs of Western Melanesia.ce**: communities may improve decision-making processes, link to other organizations and

105 O'Garra 2007a

106 Hoffman 2002, Johannes and Hickey 2004, LMMA 2006, McClanahan et al 2006. Cinner and Aswani 2007, Jenkins et al. 2007

107 Tawake et al. 2001, Aalbersberg et al. 2005. and in similar circumstances over longer time periods in Philippines: Russ et al 2004, Abesamis and Russ 2005 but see concerns e.g. Foale and Manele 2004, Hillborn et al. 2004.

institutions, influence policy development, reduce internal conflicts and improve compliance and enforcement[108].

- **Community organization**: simple resource planning and facilitation processes are being used to support community endeavors in other fields[109]. Community institutions used for management may be used for other purposes or be adapted to handle other types of projects[110].
- **Resilience and adaptation**: supporting local stewardship and promoting understanding of people's potential impact on resources provides a basis for response to new threats in the context of adaptive management and helps provide local security[111].
- **Health**: improving or securing the supply of marine protein has a direct impact on community wellbeing aside from the potential to use the same planning process for other community priorities including health[112].
- **Integrated resource management**: addressing a wide range of issues such as watersheds, waste management, community events, availability of building materials, erosion control and so on[113].
- **Cultural survival**: the considered use of traditional management measures and knowledge may slow the loss of valuable aspects of culture and improve management success, for example the use of, and respect for, tabu areas or other traditional closures[114].
- **Improved social and human capital**: Knowledge, awareness and capacity for resource management and sustainable development in general may be increased as well as governance and other linkages.
- **Security of tenure:** Pacific Island communities usually regard the traditional rights of ownership and access to resources as vital to their livelihoods, and indeed identity, and perceive that these are being eroded. Community based management may be seen as a means of re-asserting these rights.

From the point of view of many external agencies and donors the motivation for supporting LMMAS will likely relate to biodiversity and fisheries impacts. **Communities frequently report rapid and appreciable increases of marine resources within closed areas but there is an increasing body of technical literature which seems to confirm these observations and indeed the potential speed at which this may occur even in cases of periodic closures** (Table 13 and Table 14). TTable 13. Reported impacts of LMMAs on biodiversity and fisheries stocks in LMMAs of Western Melanesia.ncreases would seem likely to reflect positive impacts on the biodiversity within these areas. **Evidence for significant fishery impacts such as overall increased landings or reduced catch per unit effort is scarcer but reported in several instances** potentially reflecting the greater time required for such impacts to be detected.

108 Leisher et al. 2007. LMMA 2006. Tawake 2007. Zukuli and Clothier 2008 and in SE Asia Pomeroy et al. 2007.

109 Chambers 1992, Inglis et al. 1997

110 FSPI 2006 (cf. Paonangisu, Vanuatu), Participatory marine resource planning exercises have been used subsequently by other projects e.g. Small Grants programmes in Solomon Islands

111 Cinner et al 2006. Thaman et al 2005.

112 Leisher et al 2007.

113 FSPI 2006, Thaman et al 2005.

114 FSPI 2006, LMMA 2006

Table 13. Reported impacts of LMMAs on biodiversity and fisheries stocks in LMMAs of Western Melanesia.

Site	Management	Reported changes	Source
Papua New Guinea			
Sinub	Wildlife Management Area	Higher fish biomass in reserve (NS) Increased density and diversity of fishes within closure and in adjacent unmanaged areas (SS)*	McClanahan et al. 2006 Jenkins et al. 2007
Kilu	LMMA	Higher fish biomass in reserve (NS)	McClanahan et al. 2006
Muluk and Ahus villages	2 Traditional closures, periodic	Higher fish biomass in reserves (SS)	McClanahan et al. 2006, Cinner et al. 2006
3 villages, New Ireland	3 LMMAs	Increase in fish biomass in tambu areas after closed for 1 year (SS)	Walker et al. 2008
Patanga	LMMA	Increases in the number of blue-lined surgeonfish	LMMA 2007
Solomon Islands			
Marapa/Niu	LMMA – tabu	Increased stocks in tabu	LMMA 2007
Nusa Hope-Heloro	Community MPA	Higher fish density within reserve (scarids – SS, other species NS)	Aswani et al. 2007
Tetepare	Community MPA	Larger size and number of trochus in MPA (NT)	Allan Tippet Bero (unpublished)
Arnavon Islands	Co-managed Marine Conservation Area	Numbers of trochus and beche de mer increased in closed area (NT)	ACMCA 2002
Vanuatu			
Nguna-Pele	Network of community MPAs (permanent and periodic)	Improved abundance and biomass of fish/ invertebrate species. Spill-over from permanent reserves (SS?)	LMMA 2007
Mystery Island	Community MPA	Bumper harvests of trochus in fishing areas adjacent to MPA (CO). High abundance and size of invertebrates in MPA (NT)	T. Maltali Pers. Comm.
Takara	Community closed area – tabu	Increased number of fish in tabu area (CO)	T. Maltali Pers. Comm.
Paunagisu	Community closed area – tabu	Increase in mullet, parrotfish and giant clams in tabu area (PO)	T. Maltali Pers. Comm.
Marou	Community closed area – tabu	Higher numbers of trochus in tabu area (NT?)	T. Maltali Pers. Comm.
Lelepa, Uripiv and Wala	3 Community closed areas – tabus	Increased fish abundance in tabus (SS). [Attributed to aggregation]*	Anderson and Mees 1999

SS statistically significant, NS Not statistically significant, NT Not statistically tested, CO Community observation, PO personal observation *authors expressed caveats or mention sites that did not record improvements

To those benefits identified above must be added others, relating to the impact of support agencies and NGOS although often unintended:

- **Project benefits:** Projects may specifically pay for conservation activities, implement other projects such as "alternative income generation" or provide goods and services as part of the project that serve as incentives, ranging from transport and attendance to national and international meetings, literature, project or sponsor clothing to buildings and vehicles.
- **Money from researchers and projects:** Project activities may lead to income through payment for services (food, accommodation, transport etc.), allowances (sitting fees, per diems), opportunistic sales of handicrafts or other produce
- **Donations of material goods:** Equipment or even personal belongings may be left with the community after activities such as monitoring or trial income generation ventures or as personal gestures.
- **Prestige of project activity or linkages to outside agencies:** Apart from the opportunities that attracting the attention of outside agencies may provide there may be an element of prestige involved with working with these organizations.
- **Improvement of social standing**: Community members who attract projects or are able to muster resources to implement agendas may be motivated by the opportunity this provides to improve their standing within a community or reinforce their existing status ("big man", chief etc.).

Table 14. Reported impacts of LMMAs on biodiversity and fisheries stocks in LMMAs of Fiji and Polynesia.

Site	Management	Reported changes	Source
Tuvalu			
Nanumea	Community Conservation Area	Rapid increase in abundance of mullet in closed area	S. Alefaio (pers. comm)
Samoa			
Safata	MPA and no-take zones	Increased fish catches and decreased time spent fishing (**CO**)	H. Govan – stake-holder interviews
Cook Islands			
Nikao, Rarotonga	Re-instated traditional closure – Ra'ui	"increased biodiversity and abundance" of corals in closed area (SS)	Hoffman 2002
Fiji			
Waitabu	Community MPA	Recovered habitat and increased fish and invertebrates in closed area (**SS**)	Sykes and Reddy 2008
"5 sites" Kadavu	LMMAs	Increased fish (55%) and invertebrate (30%) abundance in closed areas over 3-4 years. Increases of fish (30%) and invertebrates (10%) in open areas. (NT)	A. Tawake (pers. comm.)
Ucunivanua	Community closed area (tabu) and managed customary fishing area	Increase in numbers and sizes of clams in closed and harvested areas (NT)	Aalbersberg et al. 2005
Sawa	Community closed area (tabu) and managed customary fishing area	Increase in numbers of mangrove lobster in closed area and "spill-over" (**NT**)	Aalbersberg et al. 2005

Muaivoso, Navakavu	LMMA and tabu area	5 target fish species showed higher densities inside the tabu than in the fished area (**SS**)	Comley et al. 2007
Navakavu	LMMA and tabu area	Increase in size and numbers harvested of 2 out of 3 fish species (**SS**)	Hubert 2007

SS statistically significant, **NS** Not statistically significant, **NT** Not statistically tested, **CO** Community observation, **PO** personal observation, *authors expressed caveats or mention sites that did not record improvements

There is potential for the intended or un-intended benefits that function as incentives to obscure assessments of the long term sustainability of LMMA approaches in the event that these incentives are reduced or withdrawn e.g. at the conclusion of a project or handover to government agencies. However, the proliferation and endurance of a great many sites across the region with relatively little outside support indicates that communities do feel that the approaches have an overall beneficial impact on their livelihoods, probably based on some or all the factors mentioned above – quantitative evidence of these wider benefits is emerging[115].

Monitoring

Some level of scientific or quantitative monitoring seems to have been conducted at a majority of external agency supported LMMAs around the region. The bulk is biological monitoring but socio-economic monitoring has been increasingly promoted and carried out. In many cases monitoring has been performed by the external agencies and provide one off research results or other findings. There has been a large push towards community-based monitoring which has resulted in many training workshops and monitoring teams incorporating community members or even, in some Fijian examples, community members carrying out monitoring alone.

The use of data generated through more community-based monitoring approaches to demonstrate benefits to wider audiences has presented serious challenges and the ability of the data to rigorously demonstrate impacts have been questioned[116]. The reasons for this are multiple and still the subject of analysis but there does appear to have been confusion as to the appropriate approaches to meet the variety of objectives of communities and projects. The wide variety of different reasons for which monitoring is promoted or undertaken goes some way to explaining this confusion[117]:

1. Stimulate community/stakeholder involvement and awareness:
2. Adaptive management by the community or project (to see if the LMMA is working)
3. Stock assessment to determine harvesting quantities or timing
4. Project/donor reporting requirements
5. Network or programme-wide learning and sharing of lessons
6. Global or academic learning
7. Advocacy or promotion of approaches or organizations

Wide consensus exists that communities appreciate participating in monitoring and that the community engagement and awareness objective is being met. There are reports of communities adapting management

115 Leisher et al op. cit.

116 Rowe 2007, Fisk 2007a, Govan et al. 2008b, U. Kaly unpublished comms. 2008

117 Govan et al. 2008b

in the light of monitoring results[118] but this probably occurs far less than the estimates of 15-20% of sites reported for example in Fiji[119]. The quality of much of the data makes its use for management questionable at best. The degree to which other objectives are being met is similarly in doubt.

An in-depth evaluation of the role and purposes of monitoring is urgently required, for community based as well as externally performed monitoring. The importance of this review lies in the current large drain on scarce human and financial resources represented by monitoring which is one of the most technically demanding skills and could conceivably be over-promoted owing to the natural bias or self interest of researchers as warned by Wilson (2007). The analysis should also examine whether (or more likely how) the various objectives can be met in more cost-effective fashion. For the purposes of the large and expanding numbers of community sites it is probable that traditional or perception based non quantitative approaches will be most cost-effective (i.e. the "data-less" management proposed by Robert Johannes[120]).

So, are they working?

From the perspective of "insiders' or community members it appears reasonable to state that the bulk of LMMAs are "working" based on their proliferation, the continued activity of the majority for several years or more and on a variety of community and external feed-back. However, a working LMMA may be achieving outcomes that do not necessarily coincide with external motives for supporting the initiative or indeed the community's original stated objectives. The wide variety of benefits and outcomes listed above suggests that different community members may perceive a variety of different benefits of the initiative, the LMMA survives presumably if the aggregate of community stakeholders benefits (expected or otherwise) surpass their costs or sacrifices.

There is evidence (almost over-whelming if community perceptions are taken into account) that LMMAs can have beneficial impacts on biodiversity and fisheries and this has long been the operating assumption. Communities appear to demonstrate satisfaction at exercising more control over their natural resources through these initiatives, certain species recover in closed areas but these may be harvested during temporary opening of the reserves and thus the benefits may be more tangible in terms of regulating "food flow" or security. But this is not to say that all LMMAs have such impacts and indeed in many cases the largest community motivation may come from unintended project spin-offs, opportunities and expectations.

The challenge for international, national and local agencies is to assist in maximizing the conservation, fisheries or poverty alleviation impacts that the LMMAs may have while not undermining the long term sustainability of their support (i.e. by establishing running costs that cannot be realistically maintained). This requires a clearer understanding of community motivations on the one hand and improvements in financial monitoring of LMMA cost effectiveness from the support agencies perspective on the other. This approach is advanced in Fiji and cost effectiveness is central to some of the approaches in Solomon Islands and Vanuatu.

There appears to be potential for increasing the benefits perceived from LMMAs by communities without incurring significant additional costs, for instance through linkages to other institutions, improved fisheries advice or security of tenure. The community engagement and ongoing adaptive management processes that are central to LMMA approaches also have untapped potential for wider use in other agencies supporting natural resources issues such as **ecosystem based management, resilience, disaster preparedness or adaptation to climate change**. This potential may even be extended to other areas including health, education and so on offering opportunities for cost sharing, access to other funding sources and wider potential benefits to communities.

118 Rowe 2007

119 Seidel 2009 states "the rationale for management adaptations were in most cases not directly attributable to the monitoring data" but based on socio-economic considerations. The figure of 15-20% pertains to a survey of liaison officers carried out by Rowe 2007.

120 Johannes 1998

Momea tapu, Nanumea, Tuvalu[121]

Nanumea is a small island atoll, the northernmost of the Tuvalu island group. History says that people of this island were descendents of a Tongan warrior by the name of 'Tefolaha', also popularly known in Samoa as 'Folasa-Aitu' who arrived some 23 generations ago. The people lived a simple Pacific Island way of life, respect and care for the environment have always in the past been an integral part of their culture. Soil is poor and struggles to produce and support enough food crops so people are heavily dependent on the integrity of coastal ecosystems.

With over harvesting of resources, population increase, shortage of imported food, and the emerging threats of sea-level rise and other impacts of global warming, there has been a growing feeling among the community to manage natural resources better and specifically to reinvoke traditional fishing reserves in the form of a 'Momea Tapu' or 'Taboo area' which used to be employed in living memory.

The community of Nanumea through the Kaupule (executive council) requested assistance from an NGO (TANGO) and the government departments of Fisheries and Environment in 2006? to implement a process of community based resources management planning similar to one piloted in the island of Nukufetau.

The community now have developed a resource management plan and agreed to close a marine area near the main settlement covering some 20% of their total reef area. The people view this with pride and there has been evidence of increase in numbers of Mullets seen by fishermen around several areas near their 'Momea Tapu' which is also well known nationally as 'Koga Tapu o Nanumea'. A numbers of other atoll islands in Tuvalu are committed to following the same simple process in future.

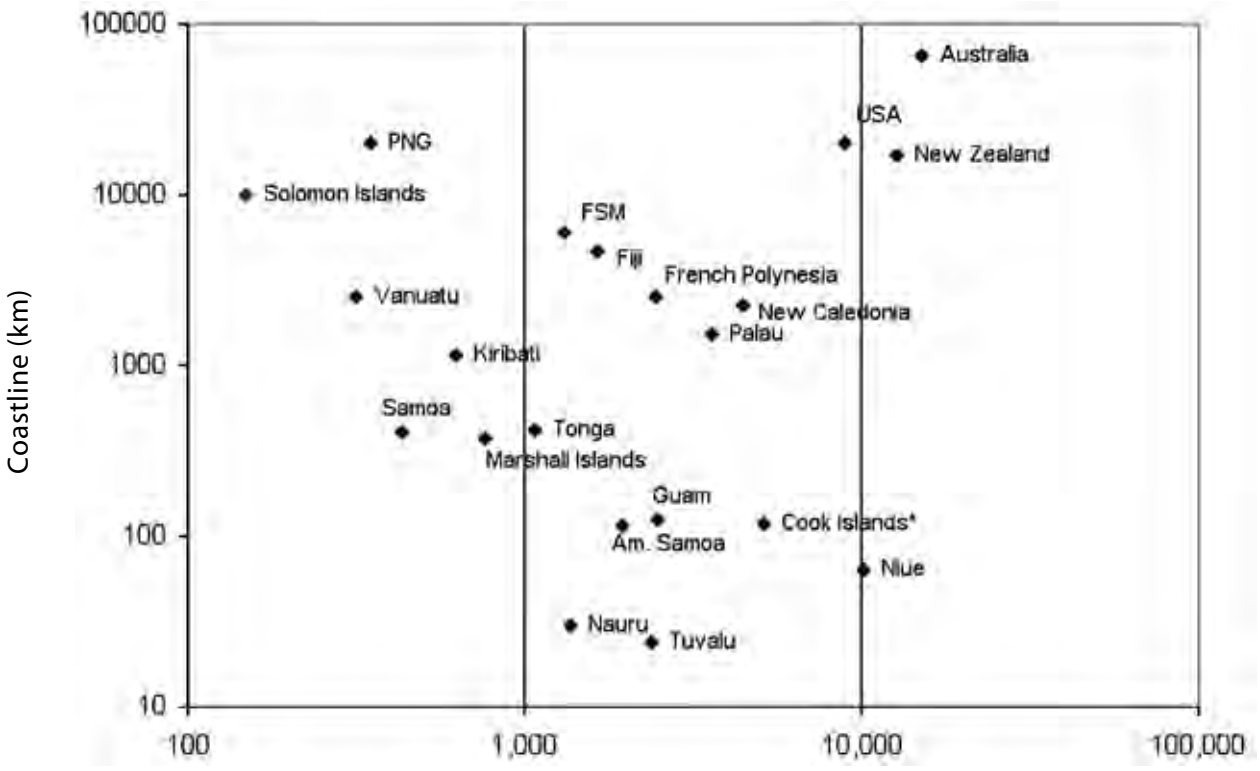
Demarcation of the Koga tapu o Nanumea (Semese Alefaio)

121 Prepared by Semese Alefaio and Hugh Govan for Govan et al. in press.

Country budgets

Information on PICT government budgets relating to coastal and marine resource management (Fisheries or Environment departments) is not available in a regionally comparable form. Some indication of relative government wealth may be derived by looking at overall government expenditure, for which data are available[122]. Such a comparison highlights the disparity between countries in terms of funds available to governments in relation to their population sizes and coastal areas (Figure 8).

Figure 8. OveraFigure 8. Overall government expenditure per head of population in Pacific Island Countries and Territories. Data are plotted against coastline (Y axis) as an indication of coastal area that countries are responsible for (Population estimates SPC 2007, government expenditure from CIA World Factbook 1999-2007).rnment expenditure per head of population in Pacific Island Countries and Territories. Data are plotted against coastline (Y axis) as an indication of coastal area that countries are responsible for (Population estimates SPC 2007, government expenditure from CIA World Factbook 1999-2007).



The independent countries of Western Melanesia have overall government expenditures several orders of magnitude lower than their major development partners. If these differences are reflected in government budgets for environmental management then these countries are attempting to manage extensions of coastline comparable to those in developed neighbours but with virtually insignificant budgets. The

122 https://www.cia.gov/library/publications/the-world-factbook/fields/2056.html

relevance of high-cost approaches dependent on centralized enforcement or intensive research would be questionable in the PICT context on this basis alone.

Government department budgets

Budgets for Pacific Island government departments are not readily available and the following information for selected countries has been collected from a variety of sources.

Fisheries departments

An annual total budget for the Fiji Fisheries department was reported to be about F$ 2 million in 2002[123] (~US$ 1 million) and it is estimated that in 2006 around US$ 110,000 was allocated by the department to "biodiversity conservation"[124], the budget for the Vanuatu Fisheries Department is Vatu 46 million in 2008 (US$ 0.4-0.5 million). These figures do not differentiate between offshore and inshore allocations. The National Fisheries Authority of PNG has at least two divisions relevant to community based management; the Industry and Provincial Liaison Division with a budget of some US$1.5 million of which US$300,000 is allocated to provincial support and training and the Fisheries Management Division with an overall budget of US$2 million. Many of the major expenditures are dependent on donor funded projects or loans[125].The Ministry of Marine Resources of the Cook Islands has a 2007-8 budget estimate of around US$ 1 million[126].

More detailed budgetary information is available for Solomon Islands (SI) as shown in Table 15, the overall budget Table 15. Summary of Solomon Island Ministry of Fisheries and Marine Resources expenses by Division for 2007 in US dollars (exchange rate: 27/11/08, source S. Tiller.t under US$ 1 million. Around US$ 20,000 has been specifically budgeted for the support of community based fisheries management since 2007 though these funds may not have been released. It is noteworthy that the inshore and provincial fisheries divisions which would be expected to shoulder much of the burden of support to communities' management (as well as their many other duties) amounted to some US$330,000 total budget.

Table 15. Summary of Solomon Island Ministry of Fisheries and Marine Resources expenses by Division for 2007 in US dollars (exchange rate: 27/11/08, source S. Tiller.

Division Name	Staffing	Operations	Total
Aquaculture	14,000	73,000	87,000
Fisheries Mgmt Policy	11,000	21,000	32,000
Headquarters/ Admin	49,000	91,000	140,000
Inshore Fisheries Mgmt	9,000	61,000	70,000
Market and Bus Dvmt	9,000	48,000	57,000
Offshore Fisheries Mgmt	55,000	173,000	228,000
Provincial Fisheries	87,000	170,000	257,000
Statistics and Admin	22,000	59,000	81,000
Grand Total	256,000	696,000	951,000

123 Fa'asili et al. 2002

124 Lees and Siwatibau 2007

125 http://www.treasury.gov.pg

126 http://www.mfem.gov.ck/

With regards to revenue, over 99% of SI fisheries revenue is generated by overseas licences and receipts from international agreements through the Forum Fisheries Agency. Additional overseas income is made from transshipment levies and observer fees and all together amounts to US$ 10-13 million yearly accruing directly to national coffers Other revenue amounting to about US$100,000 is generated mainly through local fisheries licences, fish processing and sale of fish and fishing equipment. All revenue goes directly to consolidated funds.

Environment departments

The Fiji Department of Environment is estimated to have allocated around US$ 160,000 to "biodiversity conservation" and the National Trust another US$240,000 in 2006[127]. The PNG Department of Environment and Conservation had a budget of around US$ 4 million in 2007 and 2008 of which about 10% was allocated to the "Management of Protected Areas"[128]. The National Environment Service of the Cook Islands has a budget of around US$700,000[129]. The Solomon Islands Division of Environment and Conservation had a 2007 budget of around US$ 50,000 and an estimate for 2008 of US$ 114,400[130].

Provincial government

The larger countries have greater or lesser degrees of decentralized government, at least in theory. Provincial Governments may be supported through separate budgetary allocations as well as receiving support from national fisheries or environment departments. In practice, though the provincial governments may receive valuable assistance in terms of staff support, there may be no significant operational budget allocated either centrally or at provincial level (e.g. Manus in PNG and Malaita in Solomon Islands)[131].

Government budgets for Community Based Management

There is one long-standing example of a government funded attempt to support community based management at a wide/national scale and that is the experience of Samoa though Tonga is in the early stages of a similar initiative.

Samoa

The Samoan government has the longest running institutionalized Community Based Management approach, the Village Fisheries Management Programme. A total of some 85 sites or communities have been engaged since 1999 of which some 40 – 50 are considered to be still active. An indicative budget is presented in Table 16. Clearly salaries reprTable 16. Indicative annual budget for maintenance and development of the Samoan network of Village Fisheries Management Plans (source: interview with Talavou Tauaefa and author's extrapolations on salaries and fuel coststhe major component. The fact that sites are spread across two islands with road access and a degree of decentralization (3 Fisheries Assistants are located in each island) reduce the transport cost which is underestimated given that maintenance and capital costs are not included. The figure of US$67,000 obtained is comparable to the estimate published in 2000[132] of an annual budget of US$81,000.

127 Lees and Siwatibau 2007

128 http://www.treasury.gov.pg

129 http://www.mfem.gov.ck/

130 J. Sisiolo pers. comm.

131 H. Govan, pers. observation 2008.

132 World Bank 2000b

Table 16. Indicative annual budget for maintenance and development of the Samoan network of Village Fisheries Management Plans (source: interview with Talavou Tauaefa and author's extrapolations on salaries and fuel costs

	WST	US$
Fisheries Advisory Service Budget Request*		
Village support: New communities, existing ones and management plan reviews and consultations	9,286	3,158
Awareness materials and dissemination	8,339	2,836
Internal capacity building	6,822	2,320
Mapping boundaries	5,000	1,701
Others	2,424	824
Total request	31,871	10,839
Staff (11 staff)	157,683	53,628
Transport fuel (50l / week)	8,100	2,755
TOTAL**	197,654	67,222
TOTAL per site (assuming 50)	3,953	1,344
TOTAL per km^2 of Marine Managed Area***	5,475	1,862
TOTAL per km^2 of No-take Zones****	17,039	5,795

* The budget request is not necessarily approved.

Not included maintenance, utilities, occupancy and other overheads. * assuming 36.1km 2 ****assuming 11.6km 2

The Aleipata and Safata MPAs are supported by four staff from the Marine Conservation Section of the Ministry of Natural Resources and Environment which has a budget provision for this and other MMA development. These MPAs also receive some assistance from the Fisheries Department.

Reported project and site budgets

Relatively little data have been published relating to the costs of establishing MMAs in the South Pacific. Notional costs for some sites, members of the Locally Managed Marine Area network, have been calculated[133] (Table 17), Leisher et al. (2007) mTable 17. Indicative estimates of costs (US$) per Locally Managed Marine Area for selected sites in the LMMA network during 2006 including estimate of community contribution (data modified after Rowe 2007). that the Navakavu LMMA in Fiji has cost less than US$12,000 equivalent over the five years since start up (half of this was for a boat). Based on the experience of supporting the first 71 sites under the Fiji LMMA network, costs were estimated at about $3,000 (US$ 1,600) per site in the first year, $1,000 (US$ 540) in the second year, and $500 (US$ 270) per year thereafter[134]. Outside of the geographic scope of this study, a selection of Palau MPAs are recorded to cost between US$ 13,000 and US$ 451,000 per year (Table 18).

133 Rowe 2007

134 Aalbersberg et al. 2005

Table 17. Indicative estimates of costs (US$) per Locally Managed Marine Area for selected sites in the LMMA network during 2006 including estimate of community contribution (data modified after Rowe 2007).

Country	Cost per self-sustaining site	Cost per new or recently started site	Cost per site (others)
Fiji (195 sites)	3,320	6,150	6,580
PNG (8 sites)	-	8,320	14,544
Solomons (17 sites)	-	-	2,854
Palau (23 sites)	-	-	8,348
Pohnpei (5 sites)	5,535	2,810	2,506

Table 18. Estimated annual costs for existing protected areas in Palau (adapted from Miles 2005 in Thomas 2007).

	Rock Islands	Nger-uangel	Ebiil	Helens Reef	Tululeu	Ngar-meduu Bay	Nardok	Total
Area (km^2)	340	35	15	163	0.4	15	98	666.4
Salaries	$295,000	$22,000	$22,000	$71,500	$11,000	$0	$11,000	432,500
Monitoring & Surveillance	$7,500	$43,400	$20,600	$63,750	$1,500	$0	$5,000	141,750
Field Operations	$73,000	$11,600	$11,600	$34,000	$600	$600	$5,100	136,500
Research and Special Studies	$25,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000	55,000
Equipment & Materials	$11,000	$10,900	$10,900	$7,900	$7,900	$1,400	$4,400	54,400
Institutional Support/ Admin.	$9,000	$4,500	$4,500	$8,000	$4,500	$4,500	$4,000	39,000
Training	$5,000	$3,000	$3,000	$9,000	$1,500	$0	$7,000	28,500
Construction	$10,000	$1,750	$1,750	$0	$0	$0	$1,000	14,500
Education and Awareness	$8,500	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	14,500
Professional Services & Audits	$7,500	$500	$500	$500	$500	$500	$500	10,500
TOTAL	$451,500	$103,650	$80,850	$200,650	$33,500	$13,000	$44,000	$927,150
Total/Km2	$1,328	$2,961	$5,390	$1,231	$83,750	$867	$449	$1,391

Costs of supporting LMMA sites

In the course of compiling the regional inventory of sites information on cost of MMA establishment or maintenance was requested. Relatively few sites were able to provide cost details and in most cases these consisted of total project costs under major headings, full details and calculations are provided in Annex 4 and summary results are shown in Table 19.

Table 19. Yearly costs of dTable 19. Yearly costs of different LMMAs in the South Pacific. Costs exclude community in-kind contributions unless otherwise stated (US$).nt LMMAs in the South Pacific. Costs exclude community in-kind contributions unless otherwise stated (US$).

Country	Site/project	Cost/site	Cost/ km²	Cost/km² No Take Zone	Notes
Samoa	Village Fisheries Management Programme (VFMP)	1,344	1,862	5,795	Ongoing support. 50 sites and yearly increase of several new sites.
Samoa	Aleipata MPA	6,500 – 16,000	179 – 360	2,339 – 8,394	Ongoing support, minimum represents cost shared with Safata. Comprises 1 large MPA containing 11 village NTZs
Samoa	Safata MPA	6,500 – 19,000	179 – 534	2,339 – 4,471	Ongoing support, minimum represents cost shared with Aleipata Comprises 1 large MPA containing 9 village NTZs
Solomon Islands	WorldFish, Isabel and Western Province	3,000	~100	3,500	Project average cost from startup to ongoing support over three years. 2 large managed areas containing 26 NTZs
Solomon Islands	WWF, Western Province	16,000/MPA 5,000/NTZ		2,900	Project average cost from startup to ongoing support over three years. 4 sites/clusters of NTZs
Solomon Islands	FSPI, Malaita, Gela, Guadalcanal	1,851 – 2,569		4,634 – 6,432	Includes in-kind and other indirect costs. Averages start-up and ongoing costs. 20 villages, 17 NTZs. Higher figure includes government, network and technical support
Solomon Islands	TNC, Arnavon Islands	20,000	125	125	Ongoing support. 1 large MPA
Vanuatu	FSPV	5,537		2,187	Includes in-kind and other indirect costs. Costing averages start-up and ongoing costs. 9 sites.
Cook Islands	WWF	5,000-10,000		15,000-30,000	Start-up costs. Ongoing support may be around US$3,000 / year. Estimated.
Fiji	Daku	478	81	166	Site operating over 7 years from startup

Fiji	Nasau	938	158	171	Site operating over 4 years from startup
Fiji	Navakavu	725	39	247	Site operating over 5 years from startup
Fiji	170 IAS FLMMA sites	800	14.6	265.8	Establishment and ongoing support of ultimately 170 sites over 5 years.
Fiji	Waitabu	3,000		12,000	Project costs averaged over 10 years. Single site and staff costs estimated using consultancy rate equivalent.
PNG	CFMDP, Morobe and Kavieng	3,800			Project costs for site startup. Ongoing costs estimated at US$600 per follow up visit. Some 22-25 sites.

Recently published information on MMA costs in Palau, French Polynesia and PNG were recalculated on area coverage basis to complement the above analysis and are provided in Table 20.

Table 20. Comparative yearlTable 20. Comparative yearly costs of MMAs in the Pacific derived from published figures. Not including community in-kind contributions unless otherwise stated. Global estimates included for comparative purposes (US$).s of MMAs in the Pacific derived from published figures. Not including community in-kind contributions unless otherwise stated. Global estimates included for comparative purposes (US$).

Country	Site/project	Cost/ site	Cost/ km^2	Cost/km^2 No Take Zone	Notes
Palau	Rock Islands	451,500	1,328		Miles 2005 in Thomas 2007
Palau	Ngarmeduu Bay	13,000	867		Miles 2005 in Thomas 2007
Palau	Tululeu	33,500	83,750		Miles 2005 in Thomas 2007
Palau	Nardok	44,000	449		Miles 2005 in Thomas 2007
French Polynesia	PGEM, Moorea	270,000	5,517	27,864	Feral 2008. Ongoing costs including costing of participants' time.
PNG	Pere, Manus	5,600			New site. Rowe 2007 (cost for 2006 not including community labour contribution)
PNG	Patanga, Kimbe	12,384			Rowe 2007 (cost for 2006 not including community labour contribution)
Global	Median total running costs in developing countries		1,584		Balmford et al. 2004
Global	Median actual recurrent annual expenditure – all countries		775		Balmford et al. 2004

In considering the above figures it is important to bear in mind the high diversity of contexts involved making direct comparison of figures inappropriate. Too few data are available to draw firm conclusions on factors contributing to cost but the following features were discerned:

Size of sites: Findings elsewhere suggest that size is the major determinant of MPA cost[135] and this may likely be the case in the present data. However, major caveats apply particularly regarding the purposes of the MMA and habitats covered. For example MMAs with fishery objectives may optimally require smaller sizes while those addressing endangered species may require large areas of open sea or beach which essentially have little fisheries value. For LMMAs targeting sustainable fisheries (where regulations may not be limited to spatial restrictions) cost per site or even per head of population served may be of more interest to planners.

Age or maturity of sites: Some sites are relatively long established while others are recent. Most figures in Table 19 correspond to averages for multTable 19. Yearly costs of different LMMAs in the South Pacific. Costs exclude community in-kind contributions unless otherwise stated (US$).ites at different stages. In general longer established sites seem to have reduced costs e.g. Daku and Nasau in Fiji. Extreme cases were noted in some sites from major initiatives (South Pacific Biodiversity Conservation Program or International Waters Program) or single site MPAs with costs orders of magnitude higher at the early or pilot stages. Interestingly, much of this investment was not integral to the ultimate success of the approach.

Objectives of supporting agency: Fisheries and development agency sponsored sites appear to have relatively lower costs per village but higher area costs of no-take zones compared with sites sponsored by conservation organizations. This may relate to the differences in optimum size or design for fishery purposes compared to conservation but may reflect less emphasis on promotion of NTZs and less reliance on incentives in fisheries sites.

Occupancy or overhead. None of the estimates take adequate account of the running costs of the supporting institutions e.g. the existence of an international NGO or government infrastructure. Similarly the ongoing costs of building and maintaining institutional human capacity to support LMMAs is not adequately reflected in the site estimates.

Variation in types of habitat and protection targeted: Some sites designate few habitat types e.g. a particular reef while larger ones may include large expanses of open sea as well as other habitats. Sites may be permanently closed or allow temporal or species specific variations. The less restrictive regulations appear more frequently in the sites with lower investment per community.

Clustered sites and sharing activities: Most data pertains to approaches where several sites are supported together. This reduces costs of staff and travel. Further reductions are made where single activities can be shared across various villages but this will depend on whether the use of "representatives" functions in a given cultural context, Samoa and Fiji are the main examples in this data set and show some of the lowest costs per managed area.

Other factors examined in global studies are also probably relevant in the South Pacific, for example relative wealth or development status has been found to correlate positively with MMA cost[136] and may be responsible in part for the elevated costs recorded in French Polynesia and Palau. The same study suggested that isolation correlates with reduced costs and this is potentially a factor in the South Pacific where large (and particularly urban) populations may exert high pressure on LMMAs requiring more external support for enforcement (e.g. in the Gizo Marine Conservation Area in Solomon Islands).

135 Balmford et al. 2004

136 Balmford et al. 2004

Networking costs

International and regional networks

The large regional inter-governmental organizations and the big international NGOs operate networks in the region, consisting of member governments in the former case and local offices or affiliates in the latter. The costs of these networking activities are hard to isolate from those of organizational activities, many of which are not specifically targeted at support of MMAs and therefore may have peripheral benefits at best; informal discussions at meetings and so on. In a number of cases it is quite surprising how slowly lessons and experiences have permeated within these networks, suggesting that existing mechanisms could be improved or utilized to add value for relatively little additional cost.

The most prominent non-inter-government networks operating in the South Pacific are the Locally Managed Marine Area network ("LMMA Network") and networks operated by large NGOs such as FSPI, TNC and WWF amongst their partners and partner communities. Some of these networks provide ongoing technical support and capacity building to field practitioners, particularly in their project portfolios. These inputs represent some of the major and most consistent capacity building and technical back stopping efforts. In the case of the FSPI network this may amount to around 20% of total site support investment per country, more during the start-up phase.

The LMMA network has operated since 2001 in Fiji, Palau, PNG, Federated States of Micronesia, Indonesia, Philippines and Solomon Islands. More recently a site in Vanuatu has joined and other countries and sites have been involved in different ways including Samoa, Cook Islands, Tuvalu, French Polynesia, Hawaii and New Zealand.

The main activities have been structured learning through monitoring following under a "Learning Framework", informal learning through exchanges and meetings, formal training, mentoring and support of national networks. The cost to the main donors, MacArthur and Packard Foundations, of supporting all these activities is estimated to be around US$ 0.5 million per year. It should be noted that the network includes SE Asia, that all sites within the network are expected to fund their own site based work and that country networks have also accessed other donors.

National network costs

National networking activities are carried out to some extent by government departments and for example the Samoa Fisheries department promotes inter-community exchanges and connects donors and information sources with the end users. All the Melanesian countries have used networks or umbrellas in some form or other to assist in information and experience sharing, capacity building and policy development. All these networks depend for their success on contributions or investments in-kind by their NGO and government members and these amounts are hard to quantify. In addition though such networks have received funds through the LMMA network and various donors. Table 21 shows the typical contributionsTable 21. Locally Managed Marine Area network contributions to national networks in Melanesia and estimate of total contributions from other donors and in-kind averaged for 2004-2007 (US$). Source: LMMA network.of the national networks received through the LMMA network in 2006.

Table 21. Locally Managed Marine Area network contributions to national networks in Melanesia and estimate of total contributions from other donors and in-kind averaged for 2004-2007 (US$). Source: LMMA network.

	Cost to LMMA	Total costs
Fiji	9,125	152,150
PNG	40,460	73,783
Solomon Islands	20,475	35,253

Sub-national or local networks

As mentioned above, a majority of sites are supported in clusters or local groupings and therefore networking at this level is often built in to project costs. Examples of networking explicitly supported at a sub-national level include the PNG-LMMA which operates for logistical reasons as two regional networks and the move towards decentralized implementation of the FLMMA network in Fiji. The Kadavu Yaubula Management Support Team (KYMST) in Fiji costs around US$12,000 per year and services over 50 sites, although there are some other inputs this approach shows much promise in reducing the cost per site below US$300 per year.

FINANCING MARINE MANAGED AREAS

The financial support for MMAs potentially comes from 3 main sources; government, donors and income generation. These main sources may be linked such as the provision of donor funds to governments to launch MMA initiatives as in the cases of Samoa and Tonga or private sector donations to MMAs. LMMAs depend on the actions carried out by local communities and in some cases these communities may conceivably make financial contributions. Trust funds are also used in a variety of contexts in the South Pacific and these are discussed below.

Government funding

Government allocations to MMAs have played a major role in the establishment of Village Fisheries Management plans in Samoa, although this initially derived from AusAID funding the support and extension of these MMAs is now integrated into the budget of the Fisheries Division. In Samoa as well, the Ministry of Environment and Conservation supports the Aleipata, Safata and other MPAs with staffing and some limited budget provisions.

The FLMMA network in Fiji is hosted by the Fisheries Department which aside from this institutional support provides one and half salaries and a budget of around US$55,000 [137]. Vanuatu has long linked various Fisheries Department activities (such as aquaculture) to community based fisheries management and have been able to maintain a basic level of support to a number of community MMAs with occasional support or collaboration from NGOs.

Solomon Islands Ministry of Fisheries has recently established a community fisheries section which would support community based fisheries management and although some national policy development activities have taken place the annual allocations of some US$20,000 for support of community based management in the field has not been released.

In Tonga, the Community Development and Advisory Section of the Department of Fisheries is actively engaged with the establishment and implementation of Special Management Areas for coastal communities. Originally donor funded, this process is now funded under the Fisheries Department budget.

Donor funding

Sources of funding for the externally provided support to community based management has with few exceptions come from donors including AusAID, GEF, NZAID, UK Darwin Initiative, European Union, ACIAR, Packard Foundation, Macarthur Foundation, CRISP-AFD, ICRAN and ADB. Small grants have been provided by donors such as Global Greengrants Fund, The Canada Fund and the UN Small Grants Programme. The precise amount invested by donors in CBM is difficult to estimate and obscured by the multiple objectives projects may have. A sample of publicly available grant amounts for projects in support of CBM/LMMAs in specific countries or sites is shown in Table 22 and Table 23 shows grants for reTable 22. Partial list of donor grants allocated to site support of community based management in the period 1998 – 2008. The list is not comprehensive and does not include co-financing. projects more broadly supporting community conservation. Allocations have a median of about US$ 300,000 per country and grants may cover anything from a single site through clusters of sites to multi country initiatives.

137 S. Waqainabete pers. comm.

Table 22. Partial list of donor grants allocated to site support of community based management in the period 1998 – 2008. The list is not comprehensive and does not include co-financing.

Project holder	Country	Donor	Amount	Notes
USP	Fiji	Packard Foundation	US$458,000	http://www.packard.org/
WCS	Fiji	Packard Foundation	US$750,000	http://www.packard.org/
USP	Fiji	Packard Foundation	US$315,000	http://www.packard.org/
PCDF	Fiji	UK Darwin Initiative	US$115,000	http://darwin.defra.gov.uk
CORAL	Fiji and PNG	Packard Foundation	US$425,000	http://www.packard.org/
WWF	Fiji and Solomon Islands	MacArthur Foundation	US$350,000	http://www.macfound.org/
CI	PNG	GEF	US$3.9 million	District/provincial project (Baines et al. 2006)
WCS	PNG	Packard Foundation	US$300,000	http://www.packard.org/
WWF	PNG	Packard Foundation	US$250,000	http://www.packard.org/
CCN	PNG	MacArthur Foundation	US$250,000	http://www.macfound.org/
TNC	PNG, FSM and Indonesia	Packard Foundation	US$750,000	http://www.packard.org/
WWF	PNG, Solomon Islands and West Papua	European Union	US$2.1 million	L. Heaps, Pers. comm..
Div. Fisheries	Samoa	AusAID	US$2.5 million	Phase II. Phase I received US$2.0 million. AusAID 2000.
IUCN	Samoa	GEF	US$900,000	Reti and Sullivan 2005
SPREP-IWP	Solomon Islands	GEF	US$332,863	To Dec 2006, two site component of a regional project (Fox et al. 2007)
UCSB	Solomon Islands	Packard Foundation	US$340,000	http://www.packard.org/
FSPI	Solomon Islands	Packard Foundation	US$90,000	http://www.packard.org/
TNC	Solomon Islands	MacArthur Foundation	US$325,000	http://www.macfound.org/
UQ	Solomon Islands	MacArthur Foundation	US$250,000	http://www.macfound.org/

Project holder	Country	Donor	Amount	Notes
WWF	Solomon Islands	UK Darwin Initiative	US$234,000	http://darwin.defra.gov.uk
FSPI	Solomon Islands and Vanuatu	MacArthur Foundation	US$350,000	http://www.macfound.org/
SPREP- SPBCP	Solomon Islands, Arnavon Islands	GEF/AusAID	US$171,042	One site. Total country costs represent less than 25% of regional project costs (Baines et al. 2002)
CRISP	Solomon Islands, Tuvalu, Vanuatu, New Caledonia, Samoa, Kiribati, French Polynesia, Cook Islands	CRISP – AFD	US$3.1 million	http://www.crisponline.net/
Dep. Fisheries	Tonga	AusAID	US$4.8 million	Includes fisheries management and institutional strengthening. http://www.AusAID.gov.au
SPREP- SPBCP	Tuvalu, Funafuti	GEF/AusAID	US$173,330	One site. Total country costs represent less than 25% of regional project costs (Baines et al. 2002)
SPREP-IWP	Vanuatu	GEF	US$326,849	To Dec 2006, one site component of a regional project (Fox et al. 2007)
SPREP- SPBCP	Vanuatu, Vatthe	GEF/AusAID	US$248,790	One site. Total country costs represent less than 25% of regional project costs (Baines et al. 2002)

Table 23. Partial list of donor grants allocated to regional projects with some component of support to community based management in the period 1998 – 2008. The list is not comprehensive and does not include co-financing.

Project holder	Country	Donor	Amount	Notes
SPREP SPBCP	Regional	GEF/AusAID	US$10 million	Includes some US$2.2 million allocated to countries. Baines et al. 2002
SPREP IWP	Regional	GEF	US$12 million	Includes some US$4.7 million allocated to countries. Fox et al. 2007
LMMA-USP	Regional	Packard Foundation	US$300,000	http://www.packard.org/
WCS	Regional	Packard Foundation	US$500,000	http://www.packard.org/
LMMA-USP	Regional	MacArthur Foundation	US$800,000	http://www.macfound.org/
USP	Regional	Packard Foundation	US$112,125	http://www.packard.org/
FSPI	Regional and Caribbean	European Union	US$600,000	H. Govan, Pers Comm.

Notably, most of these projects represent investments of up to several orders of magnitude greater than would be expected by the support costs estimated for the same sites in this study. This may reflect the pilot nature of many projects but also that cost-effectiveness has not been a major criteria in all but very few of the initiatives.

The amount of funding for community based resource management for sites in Melanesia and Polynesia over the last 10 years has been at a very minimum US$24 million and an additional US$17 million in regional projects intended to support these initiatives should be taken into account. However these figures represent an under-estimate, for example it is estimated that some US$6.6 million of donor funds are spent annually on broader conservation in Fiji alone[138].

Some supporting agencies may advise or assist communities to increase income or benefits through other avenues. Furthermore a number of approaches assume that projects should provide communities which set up resource management or protected areas with "alternative livelihoods" as an incentive or in compensation[139].

Income generation in MMAs

A recent study on the use of these livelihood diversification approaches for fisheries management in Pacific Islands questioned whether any had been truly successful[140]. A broader study of supplementary livelihood projects did suggest that up to two thirds of project managers **responding** in the region reported "success" [141] although this amounted less than a third of all projects approached in the survey. These results suggest a good deal of caution in interpreting, let alone promoting, alternative income generation (AIG) initiatives as part of community based marine resource management approaches. The following section lists some of the reported "alternative" sources of income accruing to communities involved in MMAs though it has not been possible to establish which, if any, are sustainable.

Ecotourism

Perhaps the most widely promoted AIG in the context of conservation has been that of tourism. While tourism has undoubtedly made major contributions in some locations and in some countries the track record of success where "eco-tourism" was intended to be provide alternative income sources to communities involved in MMAs is considerably less impressive – as noted in one regional review "it was a mistake to define ecotourism potential on biodiversity values with inadequate consideration of the market prospects for each site"[142].

Given the understanding that eco-tourism is by no means likely to be a panacea it is clear that income from tourism can be a useful "supplement" to community livelihoods such as the Waitabu and Aleipata / Safata examples in the order of US$ 1,500-4,000/year (Annex 4). In these situations the ability of communities to negotiate arrangements with private sector operators and/or exploit occasional opportunities provided by "drop-in" tourists can be the source of welcome cash injections.

Examples from Solomon Islands include income from tourists that visit and snorkel in Sisili MPA and pay a rate of US$ 4.5 per head. In the Marapa MPA occasional visitors and project staff pay about US$ 9 per night to stay in the community rest house and US$ 1.5 for food, in all cases the incidence is rare[143].

138 Lees and Siwatibau 2007 (although these figures overestimate the investments of some regional NGOs in Fiji)

139 Aswani and Weiant 2004

140 Gillet et al. 2008

141 O'Garra 2007b

142 Baines et al. 2002

143 H. Tafea Pers comm.. 2008

The small 'Mystery Island' off the coast of Aneityum in Vanuatu receives regular visits by cruise ships. Fees accrue to the tourism committee and tourist expenditures ashore provide a substantial incentive to establish a marine protected area around the island which receives the bulk of the tourist visits. The area has been closed for some 10 years now and abundant stocks are appreciable including of elsewhere rare or extinct species[144]. It is hoped that a similar, if less regular, arrangement will operate in the Arnavon Islands (Annex 4).

Tourism leases, user fees and stewardship

In a number of countries tourism developers may lease or otherwise negotiate with local landowners for rights to develop or use areas of coast and sometimes sea. These arrangements may in some cases include aspects relating to environmental stewardship. The Shangri-La Fijian Resort for example contributed additional financial resources and capacity building to the local community as part of collaboration towards improved coastal resource management[145]. At another Fijian site, a hotel pays US$2 to a community trust fund for each scuba diver that utilizes the village's protected area. This provides an income of roughly US$1,000 per year[146]. These examples illustrate the potential for revenue to be generated in exchange for ensuring improved environmental quality of resources that are leased or shared.

Fishery projects

Fishery development projects are commonly linked to community resource management or conservation projects. However, a recent review found little signs of success and indeed it appears that such ventures usually fail once subsidies are removed[147]. Such a case occurred in the Arnavon Marine Conservation Area and to make matters worse unintended consequences included the use of fishing gear originally provided for diversification into offshore fishing to fish within the conservation area[148]. A number of ongoing projects are experimenting with inshore Fish Aggregating Devices (FADs) as part of community based conservation projects and these may hold some promise provided that mechanisms to ensure community ownership and ongoing maintenance of such devices is built-in. Hitherto these relatively costly devices eventually degrade or are vandalized and communities are not inclined to replace them.

It has been pointed out that a successful LMMA is, in effect, an alternative income source[149]. An increase in fishery resources not only improves nutrition but also raises household income from market sales. In Fiji, communities are able to charge more for the annual fishing licenses they sell to outsiders (or at least try). Following a 1997 moratorium on issuing such licenses in Verata chiefs agreed to sell a single license for $30,000 in 2003, prior to that the sale price was $500 although 30 were sold.

Aquaculture projects

Aquaculture or artificial stock enhancement projects have commonly been linked with resource management or conservation projects as well. As stand alone businesses there appear to be relatively few examples of successful community based aquaculture ventures. Seaweed farming in Solomon Islands and Kiribati has been cited though has not been sustained in Solomon Islands and depends on government subsidies in Kiribati. Pearl farming may provide opportunities for income to communities through leasing of grow-out areas or collection of spat[150].

144 H. Govan pers. observ.
145 Robinson F. in Lockwood et al. 2006, H. Govan pers. observ.
146 Aalbersberg et al. 2005
147 Gillet et al. 2008
148 BCN 1999
149 Aalbersberg et al. 2005
150 O'Garra 2007b

In the context of LMMAs in Fiji a village is "planting" artificial live rock substrate provided by an aquarium fish exporter in its protected area. The rock requires only occasional cleaning by the community and within a year the company harvests the rock with local help. The potential return to the community is estimated at $4,000 a year.

Perhaps the most impressive (and best documented) community use of aquaculture in the South Pacific has been the provision by the Vanuatu Fisheries Department of hatchery reared trochus spat to rural communities. Communities had to meet a number of criteria including fishing closures for trochus and undertake to respect size restrictions. The tangible success in terms of increased harvest triggered the revival of traditional management in a number of communities and management of other marine resources[151].

A large number of aquaculture initiatives have been proposed as suitable alternative income initiatives. Tilapia and giant clam seed were provided by the Village Fisheries Management Project in Samoa, coral can be farmed for the aquarium trade, other aquarium species such as banded lobsters can be captured as larvae and reared in holding cages until sold to exporters[152]. However, so far none of these ventures have demonstrated long term economically sustainable potential given that initially large inputs in the form of subsidized hatchery or equipment costs are made, that market prices may fluctuate widely and marketing chains may be hard to maintain without external support. For the present it seems prudent to avoid high expectations of aquaculture as other than a potential supplementary livelihood option in specific circumstances, usually requiring ongoing subsidy.

Other alternative income generation options

Bioprospecting has been used as part of the conservation initiative in Verata, Fiji. An arrangement that took into account recommendations under the Convention on Biological Diversity was set up with a pharmaceutical company in which the community was paid licensing fees for samples of medicinal plants and marine invertebrates collected in their district. These activities earned $30,000, which the community put toward a trust fund to sustain their resource management work[153].

Local resource management as the alternative

As a conclusion to this section on alternative income generation experience related to marine resource management the recent regional review sums up with a cautionary note[154]: "**possibly the most important lesson learned is that its performance has not been to the level where it can be considered an effective resource management tool. In many cases, livelihood diversification could even be a distraction that deters communities from gaining an awareness of the need for, and benefits of, more effective forms of marine resource management**". Considerably more analysis of the limited achievements to date is required before "alternative income generation" or, for that matter, marine aquaculture can be accepted as proven components of marine resource management programmes. In the meantime, the most promising and cost-effective approach to "income generation" and sustainable livelihoods appears to remain the relatively modest investments in local management of resources.

151 Johannes 1998, Johannes and Hickey 2004

152 Fa'asili and Taua 2001, Lal and Cerelala 2006, Lal and Kinch 2006

153 Aalbersberg et al. 2005

154 Gillet et al. 2008

Trust funds

Trust funds have a track record in the region with those of Tuvalu (Tuvalu Trust Fund) and Kiribati (Revenue Equalisation Reserve Fund) being prominent examples at the national level. There are also some salutary warnings and lessons learned such as the Nauru Trust Fund which was squandered through poor governance[155].

National level trust funds targeting conservation include the Micronesia Conservation Trust Fund, Cook Islands Environment Protection Fund Trust and the PNG Mama Graun Conservation Trust Fund which may provide useful lessons learned in how such funds can be administered. In addition the region has a number of experiences establishing trust funds to serve MMAs at a national level such as the Fiji LMMA Trust Fund and also specific MMAs or clusters of MMAs such as the Aleipata Safata Marine Protected Area Society Trust Fund and the recent Arnavon Community Marine Conservation Area endowment.

Micronesia Conservation Trust Fund

The Micronesia Conservation Trust was launched in 2002 with the goal of providing a critical, long-term source of funding for biodiversity conservation in Micronesia. The trust was created by a group of public and private sector leaders from the country's four States created and in addition to providing financial support, the Trust emphasizes the building of capacity of Micronesian organizations to design and manage conservation programmes. It also intends to provide a forum to bring together all sectors of the community and government to form networks and partnerships and develop best practices based on shared experience. A Board of Management has been formed to develop a strategic and financial plan. The Trust's long-term funding goal is a $20 million endowment that should generate approximately $1m per year for conservation. The Micronesian Government has designated the Trust as the funding mechanism to support the implementation of its National Biodiversity Strategy and Action Plan[156].

Cook Islands Environment Protection Fund Trust

The trust fund was established in 1994 and receives contributions from international departure taxes. The fund is to be spent on the conservation and protection of the natural environment as approved by Cabinet. This includes the "protection and conservation of the reef and foreshore"[157] but it is not clear to what extent the fund is secure against government budgetary re-allocation.

Papua New Guinea Mama Graun Conservation Trust Fund

The Papua New Guinea Mama Graun Conservation Trust Fund (PNGMGCTF) was set up in 2000 as a private charitable corporation with a 12 member governing board. Mama Graun is working to mobilize funding from a variety of public and private sources to build an endowment to provide long term, sustained funding through a grants program that rejuvenate, expand and support Melanesian countries Protected Areas Networks.

In addition to providing financial support, Mama Graun is placing special emphasis on building the capacity of Melanesian land owners, resources users and organizations to design and manage conservation programs. Mama Graun is a conduit that brings together people from government, private enterprise, community and non-profit organizations to collectively address the challenges of natural resource management in Melanesia, enhancing public-private partnerships, and sharing experiences and best practices.

155 Graham 2005, ADB 2005

156 Thomas 2007

157 Thomas 2007

Currently, Mama Graun supports 12 small priority protected areas in PNG through Mama Graun grants program (including at least 7 MMAs). Grants presently range from US$ 4-10,000. In addition to the 12 areas, Mama Graun has commenced scoping to increase funding support to larger protected areas and committed to expanding its services to Solomon Islands, Timor Leste, Vanuatu, New Caledonia, and Fiji[158].

FLMMA Trust Fund Initiative

The Fiji Locally Managed Marine Area Trust Fund Initiative was originally set up when FLMMA won the Equator Initiative Award of US $30,000 in 2002. It is intended to be a pool of money that will service the monetary needs of FLMMA communities in implementing their management plans and monitoring of impact of management actions on their protected areas and other activities in line with FLMMA goals for community-based marine conservation. The Trust Fund is seen as a 'revolving' fund so that users deposit into the funds and every member has continuous access. FLMMA is a registered non-profit organisation managed under its own Constitution. Donors are encouraged to contribute to the Fund including 10% of grant funds that members receive. This aspect has not materialized either from the reluctance of NGO administrators or for tax law reasons. However, the fruits of other collaborations do go to the trust fund such as the Marine Managed Area Science collaboration with Conservation International and US$26,000 from the 50% bioprospecting fees accruing to the Fiji Government. The CI grant (which could also be seen as compensating people for their role in the CI MMA project) is actually the fourth major contributor. The Fund is intended to cover the cost of monitoring biological and socio-economic change in the conservation area network[159].

Aleipata Safata Marine Protected Area Society Trust Fund

The trust fund was established in 2003 with US$8,600) earned by these two MPAs from tourism and other fees. The endowment was expanded in March 2008 with a donation of US $104,000 from Conservation International (CI) and the Coral Reef Initiative in the South Pacific (CRISP). The expanded endowment is expected to contribute 30% of the annual funds necessary to manage these community-based MPAs. It is managed in a trust fund overseen by a local board of community leaders, advised by international financial experts. It is important to note that this endowment was initiated by the community with their own contributions and leaders demonstrated that good governance of such funds is not only vital but possible[160].

Endowment for Phoenix Islands Protected Area, Kiribati

In view of the fishing revenues that are expected to be lost in the newly created Phoenix Island Protected Area (410,500 km^2) efforts are now being made to create a PIPA Endowment Trust fund. Initiated with US $2.5 million funding from CI this endowment is expected to grow with matching funds from private and public institutions. The endowment will serve to support management costs and compensate the government of Kiribati for lost revenue suffered from cancellation of fishing licenses. It will be overseen by a board of managers including personnel from CI, the Kiribati government, New England Aquarium, and other entities[161].

Other local or small scale trust funds

The potential for community operated trust funds to encourage ownership of alternative or small scale projects such as Fish Aggregating Devices. Such projects while arguably of benefit to communities are almost always short lived and unsustained as when natural wear and tear or vandalism come in to play the

158 Mogina 2008

159 Thomas 2007, Aalbersberg pers. comm.

160 MPA News 2008, #10.

161 MPA News 2008, #10, S. Taei pers.comm.

equipment is not replaced. A locally managed trust fund with clear rules and mechanisms might ensure that communities discuss more appropriate investments and generate more ownership of such ventures with the object of ensuring maintenance, reduced vandalism or replacement should they be of community benefit.

The Koroinasau / Korolevu-i-wai Qoliqoli Trust (KKQT) was formed by resource owners to ensure the protection and preservation of their customary fishing grounds through training and undertaking legal processes. Using the benefits derived from this protection and management the resourced owners seek: 1. the promotion of education and training, 2. community development and social well-being, and 3. commercial activities of benefit to the resource owners. The trust is registered and serves to unite the traditional resource owners sharing responsibility, decision-making and benefits. The gross sales of the businesses utilizing the marine area exceed US$25 million a year and there is potential to better engage traditional resource owners and commercial interests in mutually beneficial arrangements for resource management to ensure the sustainability of the environment and everyone's livelihoods[162].

In Fiji there are at least another 2 district Trust Funds for marine conservation, one established with bioprospecting funds (Verata) and another from a portion of village income generation (Daku)[163]. In Solomon Islands the Arnavon Community Marine Conservation Area has recently received an endowment (see Annex 4).

Costs borne by communities

The other vitally important contribution to community based management is of course that made by the community itself. This usually will consist of labour, time and use of traditional or other institutions in planning, managing and enforcement. The costs of these contributions have not been quantified to date but it is reasonable to suppose that the "cost' of these inputs must remain below the "benefits" perceived by community members for such initiatives to be sustained in the long term. Some approaches (e.g. FLMMA-IAS[164] or FSPI[165]) work on the basis that the major benefits for communities will be in fish landings or meeting other community objectives such as erosion control, waste management and so on. A greater understanding of the costs borne by communities implementing LMMAs compared to less community driven alternatives may help inform planners but may also help dispel the myth that protected areas cannot be achieved without "income generation projects"[166].

162 Bonito undated

163 Aalbersberg pers. comm..

164 Aalbersberg et al. 2005

165 Govan et al. 2005

166 Perpetuated in e.g. Fox et al. 2007 amongst many others.

Paunagisu Village, Efate, Vanuatu[167]

Custom launching of Paunagisu "tabu" Area organized by the Paunagisu Marine Life Management Committee and the chief counsel (Tevi Maltali)

Paunagisu village is a coastal community of more than 700 people who depend heavily on the marine resources and subsistence farming for a livelihood in this beautiful setting bounded by islands to the North, East and West. In common with other communities on the island of Efate, the proximity of the capital, Port Vila, increases the pressure on marine resources and community governance with predictable results. This pressure often leads to conflicts in some areas including Paunagisu.Historically traditional marine resource management took the form of "tabu" or bans on harvesting which would be set for a specific period of time. The village in common with many others in Vanuatu has been reviving local management and in 2006 the community produced a participatory management plan that is being implemented including a fishing ban or large "tabu" area and other community initiatives such as waste management and protection of mangroves. The community has been supported by the NGO FSP Vanuatu and in close partnership with the national Fisheries Department and also the NGO "Wan Smol Bag" to support a process of village based coastal management planning. The community reports a gradual recovery in marine resources and a revival of collaborative spirit in this large community. FSP Vanuatu is encouraging the North Efate communities to support each other through networking and are now piloting community driven Integrated Coastal and Watershed Management in 5 other sites in Efate and Aneityum.

167 Prepared by Tevi Maltali and Hugh Govan for Govan et al. in press.

ACHIEVING THE POTENTIAL OF LOCALLY-MANAGED MARINE AREAS IN THE SOUTH PACIFIC

The unprecedented surge in community based coastal resource management that has taken place across the South Pacific in the last decade appears to offer much hope for the widespread achievement of Pacific Island livelihood and conservation objectives. Building on local and traditional strengths these forms of resource management offer opportunities for conserving, not only resources, but the resilience of Pacific Islanders which has been key to the survival of their way of life. Haste in attempting to take these approaches to large scale or in applying large new injections of funds could erode the very foundation upon which they depend. As recently stated by the Prime Minister of Solomon Islands the **"self-sufficiency of the subsistence community [which] is an asset that must not be overlooked or undermined. We have a degree of self-sufficiency that provides an important protection from the risk of vulnerability."**[168]

The following sections examine the main features of the approaches to emerge and discuss their potential implications for larger scale implementation.

Seeds of management

Perhaps the single most significant observation is the recognition that across hundreds of documented sites and perhaps even more undocumented ones local communities are actively "managing" their resources. Problems are being identified, decisions made and actions carried out providing the fundamental building block for resource management and indeed sustainable development in many countries. **It will be important for government and supporting agencies to nurture this "seed" as a basis for more holistic management of community and national development.**

This will entail full recognition of the potential and also the limitations of the approaches and the development of kinds of institutional and legal support for which there is no modern precedent, possibly entailing adaptations of traditional institutions or the development of hybrid ones. **Staff and institutions may require a shift in mindset towards facilitation and support rather than command and control,** a shift that is already becoming apparent in some countries.

Objectives

The motivations of communities centre on improving livelihoods and often relate to food security or improved harvests. Objectives may be explicit but may also be varied and unarticulated. Communities would most likely benefit in many cases from broader discussion of problems and root causes to ensure wider understanding of, and local compliance with, community management decisions and actions. Such processes may help avoid inappropriate use of tools (such as MPAs) in situations where these are unlikely to have much benefit. **The articulation of community discussions and decisions would provide essential reference points for communities in ongoing adaptive management and for the better coordination of support agencies.** This does not necessarily entail complex "management plans" and indeed the simpler and more community appropriate the better.

168 Hon. Dr Derek Sikua 2008

Community-Based Adaptive Management

The elaboration of plans based on more or less defined objectives and the ongoing evaluation of progress by communities has been termed Community-Based Adaptive Management[169] (CBAM). These adaptive management processes are relatively common place where widescale and long standing approaches are operating. Frequently, external agencies will provide the trigger for the review process or at least be party to its conclusions and so CBAM may be more appropriately termed Community-based Adaptive Co-management.

The management is carried out primarily by the community and the relevant user groups but also, involving appropriately the locally and nationally relevant institutional and private stakeholders. This makes optimum use of social capital such as existing (or assigned) resource rights, local governance, traditional and local information, self-interest and self-enforcement capacity.

The local community sets priorities and establishes objectives and proposed actions based on the available, and usually local, information. Actions are implemented and results are checked periodically[170]. Plans represent a community agreement and are frequently simple one page documents. Results of checking (which may be scientific or perceptual) and any new information are used to review the plan and modify it as appropriate. This provides good opportunities for new information or initiatives to be incorporated e.g. disaster preparedness or climate change adaptation.

It is clear that community based adaptive management is a simple and not even alien concept given its similarity to many traditional resource management approaches[171]. What is relatively new, or at least so far not widely accepted[172], is the proposal that this approach could form the basis for securing the wellbeing of resources and communities of the Pacific Islands.

To maximize the potential of adaptive management approaches the articulation of community "plans" and regular participatory review of these plans should be incorporated into support strategies for all natural resource and community development initiatives. In addition, adaptive management, as "learning by doing", should be performed not only at the community level but also by supporting agencies – all too often staff merely repeat the mistakes or assumptions of the past.

Management tools

Management tools selected by communities tend to be simple to implement or enforce such as area or seasonal closures, restrictions on specific fishing techniques, waste management and restoration activities. Experience suggests that some benefits should be tangible and prompt in order to fuel continued management but, importantly, these need not be monetary.

Owing to their simplicity and cultural relevance, and to varying extents of international pressure and interest, various forms of no-take zone are the most commonly implemented tools. However, considerable scope exists for tailoring these better to community objectives to avoid the risk of disappointing failure and de-motivation. **Other tools that should be considered for the whole area under customary tenure include closed seasons, protection of nursery habitats and spawning aggregations or restriction of destructive practices.** National regulations, once understood and applied in the light of local problems, stand far better chances of enforcement – the key is that rules should be simple and easy to apply fairly.

169 Govan et al. 2008a, Govan 2008

170 In Fiji, about a third of villages reportedly define quantitative goals and monitor them scientifically (Govan et al. 2008b)

171 Hickey 2006, Cinner et al 2007.

172 See for example Johannes 1998 and the case for data-less management

Given that improved fisheries harvests are the prime driving force for most communities there is an urgent need to ensure that appropriate fisheries related advice is available, something which would require enhanced skill sets in NGOs and increased engagement with fisheries management institutions. A caveat applies though as much of the fisheries management experience in the region has been driven by inappropriate western models that are data intensive, expensive, inflexible, and totally unsuited to the context of the Pacific Islands[173].

Customary tenure as a management unit

Experiences in Samoa and Fiji and increasingly Solomon Islands and PNG demonstrate that community based management of the entire customary tenured area is feasible. In most cases this has been restricted to the marine environment reflecting practitioners' bias rather than major impediments. **Owing to the limitations of small area closures as a sole management tool, the need to manage the wider fisheries or resource impacts and indeed the desirability of more ecosystem-wide approaches, all existing and future adaptive management should consider the possibility of including the wider tenured area in community planning.**

The expansion of management to wider areas does have potential for conflict at two levels. At the community or local level this could provoke or fan existing boundary disputes, however, simple approaches to early identification and potential exclusion or buffering of such situations should be relatively easy to devise. **It will be important to develop guidance for practitioners on working with tenure, improving the use of traditional ecological knowledge and other related social factors in each country**. At the national or central level there maybe some degree of reluctance to what may be perceived as validating local claims over what may be constitutionally national or "crown" property, again, this should be open to simple work arounds in so much as the approach is restricted to "resource management". After all, Tonga with state ownership of all coastal resources has been able to pass legislation allowing for progressive community based management.

Sizes and constancy of No-take zones

The western concept of Protected Areas was perceived to fit well with traditional management practices in the Pacific and, driven by ambitious global targets to achieve large proportions of protected area coverage, has originated much of the support for LMMAs in the South Pacific. **Significant differences between community implemented closures and Protected Areas do of course exist and it is urgent to explore these differences before planners design national approaches to MPA coverage or sustainable development.**

Traditional closures or taboos are but one of a suite of traditional resource management tools intended largely to ensure the sustainable use of resources and, more accurately perhaps, sustain communities. To this end area closures are flexible and may be occasionally or routinely harvested and may have dimensions (usually small) optimally suited to enforcement and tenure. These represent differences with some Western perceptions of Protected Areas.

Although **smaller no-take, strict reserves or closed areas are criticized as not being suited to biodiversity conservation, the chances are that in fact smaller reserves are better suited to the fisheries management objectives of communities as well as being more appropriate to local tenure and enforcement capability. These closures can also prove an important community rallying point for other more mundane, but nevertheless vital, aspects of management plans**.

173 Cf. Ruddle and Hickey 2008, World bank 2000a, Munro and Fakahau 1993

As pointed out elsewhere, when designing reserve shape for biodiversity conservation it is thought to be important to minimize edge habitat and maximize interior protected area (large and circular would be optimum). While in contrast, for fisheries management, the type and spatial extent of the habitat bordering the MPA may be more important than size (large size would be of little benefit and greatly reduce available fishing grounds), since this will influence emigration or spillover[174].

Undoubtedly some of the community reserves are very small and could achieve more of the community expectations if larger or differently configured. The opportunity afforded by CBAM is that communities, based on external advice, or more likely other communities' experience, may be willing to try different temporal or spatial configurations. If subsequently the benefits of these are perceived to outweigh the costs in terms of enforcement or conflict then they may be adopted.

Similarly, community reserves are usually designed to be opened periodically; this provides a way of ensuring that food will be available at specific times. This approach is less commonly adopted elsewhere for biodiversity conservation but not incompatible with certain categories of Protected Area and indeed common-place as a fisheries management tool. Recent evidence suggests that periodic closures may well be well suited as a fisheries management tool in the Pacific and its role in biodiversity conservation needs to be further explored.

Ultimately then, in the prevailing LMMA approach, communities are deciding constancy, sizes and configuration of reserves that work for them, this is a factor that needs to be taken on board in the context of national or ecosystem wide management. Management and enforcement is occurring at the local level but the temporal aspects may need new approaches in terms of monitoring or planning.

Achieving ecological networks or representative coverage

Key to the incidences of rapid expansion of LMMAs have been the social and institutional strategies employed. Agencies have usually set logistical, social and other community criteria to guide site selection rather than explicit ecological ones. Criteria such as community motivation and interest, absence of conflicts or logistical support considerations along with an adaptive learning approach have ensured that a large body of "successful" or pilot experiences have been accumulated which then serve to inform approaches in other communities.

Initial technical input may often be reduced to simple rules of thumb based on experience elsewhere or existing scientific information. Communities adapting this in the light of traditional and local knowledge have a starting point for implementation which can be improved in the light of experience or as new information arrives in the community.

These "learning by doing" approaches are ill-fitted to western and external conservation planning. Experience continues to suggest that applying externally derived geospatial priorities to implementation of community conservation is an expensive approach that risks establishing management in reduced areas and increasing dependence on incentives or investments of external resources. National governments will be interested to ensure that prioritization does not restrict the opportunity for more generalized (e.g. livelihood) benefits becoming available to a wider population.

The history of protected areas in the South Pacific suggests that failure to understand the inadequacies of top-down planning and externally imposed models will result in even more expensive failures in attempts to upscale. This concern is exacerbated by the risk of undermining the existing functioning or promising approaches.

174 Halpern and Warner 2003, IUCN-WCPA 2008

Probably the most constructive and sustainable approach are those demonstrated in Samoa and Fiji and more recently in selected districts elsewhere. This entails setting up national or subnational approaches to widescale establishment of LMMAs based on principles for successful and sustainable establishment derived from experience. Conservation inputs would be usefully employed in monitoring the biodiversity aspects of this approach, selective research on key or emerging issues and inputs into advice and procedures implemented at the field level that maximize benefits.

Planning processes and techniques

There is always a temptation to use the most sophisticated tools that are available. However, in the case of the wide scale promotion of CBAM **it is essential that the tools be as widely adaptable, inclusive, simple and intuitive as possible. This is essential for both communities and support agency staff.**

Communities do benefit from the simple tools that help rationalize planning processes and also from the support of external (neutral) facilitators. The processes and tools may have to be applicable to large groups and in some cases the bulk of the community or stakeholders. The tools and processes employed by the community should also be directly related to the agreements and implementation strategies and be as transparent or accountable as possible. In addition they should provide outputs that can be discussed with outsiders with little risk of misunderstanding and facilitate internal and potentially external evaluation as part of adaptive management.

Equally, staff from implementing organizations may come from a variety of backgrounds and opportunities for formal training may be rare. The techniques and processes need to be easy to understand, based on simple principles and readily adaptable to local circumstances. They should also be easy to track and assess to facilitate quality control detect systemic problems rapidly. In practice field facilitators have come from fisheries, conservation, university, and community backgrounds.

Social networks

Social networks or support "umbrellas" have played a crucial role in the establishment and ongoing support of communities and agencies programmes. Operating at the sub-national, national and international levels these networks provide opportunities for learning that are more flexible than more formal approaches and also allow communities to establish linkages that may promote resilience ecologically and also culturally.

In some cases it may be possible for government agencies to provide the bulk of these network services but they have been particularly enriched where they have been open to all sectors and indeed in Melanesia they have been originally driven by civil society before concerted attempts to encourage governments to take lead roles.

The linkages that networks facilitate should not be underestimated as they may encourage the development of new and more appropriate institutional relationships and structures, the coordination of interventions and policy at a national level, management of conflict and information flow. Prescriptive approaches to networks are likely to stifle them and it is hard to identify single key ingredients other than building trust and ensuring the commitment of the individual or institutional members to making it work.

Most countries have adopted, or are moving towards, a decentralized approach to LMMAs. This reduces logistical challenges and costs in supporting networks and may improve responsiveness of institutional support to local issues.

Information and research needs

Much emphasis has been placed on "awareness raising" and environmental education and information is indeed of great interest to communities. However, considerable increases in effectiveness and savings can be made by more strategic approaches to this information flow. Much of the information used in different programmes overlaps and despite some of it being shared donors still fund re-invention of these wheels. A few judicious additions to existing sets of posters[175] and audio-visual aids would most likely cover the initial needs of most communities. Participatory information and awareness raising tools have been used successfully as part of planning processes with little additional cost.

A number of areas have not been adequately addressed in information materials and this reflects the interpretation of priority information needs by outsiders or the lack of research in those areas. Indeed research should be more responsive to the needs of the managers i.e. communities and their support agencies. At present research and capacity priorities are often derived from outside the region based on models of management that are not applicable. **There is now considerable technical support capacity in the region but agencies face the challenge of discerning priorities on the ground. New approaches to improving communication between communities and their support agencies on the one hand and research institutions on the other are needed**[176].

Some of the key research or information issues that have emerged from communities or their support agencies include:

- Management information for individual species of interest to communities.
- How to achieve national fisheries and biodiversity objectives through organic spread of CCAs
- Optimization of traditional closure systems (small size and periodic opening) as a management tool
- Application of similar management approaches to watersheds
- Ensuring that community information needs are addressed by research institutions

Integrated resource management as the basis for sustainable livelihoods and conservation?

The features of LMMAs, particularly in terms of size and permanence discussed above imply that for these to fulfill their conservation and livelihood potential it is necessary to boost the expansion and growth of the approach until adaptive management becomes the norm rather than the exception at the community level.

The potential of the Pacific Island experience of CBAM goes far beyond achieving international goals of "representative networks of MPAs" but rather the much more widely called for systems of Integrated Coastal (or Island) Management (ICM) or Ecosystem Based Management that address livelihoods, development, inshore fisheries and conservation as a whole[177].

Current assessments suggest that MPAs alone will do little for biodiversity or livelihoods in the face of increasing upstream or watershed impacts, global impacts, generalized unsustainable marine resource use and increasing population and social pressures. These threats stand a better chance of being mitigated through integrated and wide ranging approaches based on community adaptive management and extended through networks and linkages to other stakeholders at other locations and scales.

175 E.g. the initiative by FSPI to make freely available the artwork for posters on coastal resource issues which has resulted in their adoption and translation in over 7 countries (http://www.fspi.org.fj/program/coastal/ awareness_posters.htm)

176 Wilson 2007 warns that self interest frequently clouds the priority setting capacity of researchers.

177 Whittingham et al. 2003, Bell et al. 2006, World bank 2006. Jenkins et al. 2007

Integrated or ecosystem management that works may be best approached in a similar "learning by doing" fashion building on similar simple and intuitive participatory processes. Using CBAM institutions as the basic building block for representation at larger scales these stakeholders can coordinate and interact with upstream wider scale institutional stakeholders. Many of the participatory planning tools and processes used at community level are suitable at this scale. Once again, the focus would be on achieving active and tangible management rather than on comprehensive but ultimately inapplicable technical understanding. Experiences in Fiji and elsewhere suggest that this is not an unrealistic scenario and provided it builds on local culture it should provide a constructive avenue[178].

International obligations stand a good chance of being met, in a more sustainable and locally relevant way as community based approaches usually generate the most enforceable examples of closed areas/MPAs and often serve as stepping stones to larger systems of protected areas or conservation initiatives[179].

Achieving the potential of ICM based on CBAM will involve developing strategies that integrate hitherto separate conservation, fisheries and livelihoods sectors and address some relatively neglected but vital areas.

Institutional and legal frameworks

In Polynesian countries, governments have played a more or less central role in implementing LMMAs within a relatively clear legal context. In contrast, most Melanesian countries have seen the prominent role of civil society organizations in promoting and sustaining support for LMMAs.

Although it has been widely recognized that it is neither appropriate nor sustainable for NGOs to play a long term and central support role to LMMAs there have been mixed results in attempts to build government capacity to support these networks instead. Where progress has been made it is clear that long term and patient investment in staff training and government institutional priorities are required including cost-sharing of staff and other support. Future initiatives should ensure appropriate government involvement from the design stage through to hand-over.

In most countries the Fisheries Departments are perceived as the most appropriate lead agency but some confusion exists in others. As communities are primarily interested in livelihoods or fisheries benefits Fisheries Departments seem appropriate. In addition, Fisheries Departments are always better resourced and have relatively large numbers of decentralized field staff (provincial fisheries officers and so on) making them well placed for the long term support of communities that will be required.

Environment departments could emphasize their crucial role outside of the routine extension-type work needed to support LMMAs. Well placed in terms of access to expertise and possibly external funding, they could ensure an overview of the more ecosystem wide issues including the fulfillment of national obligations within the context of the expanding network of LMMAs. In addition, selective monitoring of key issues such as vulnerable ecosystems and endangered species could inform and help coordinate the community based work to achieve the maximum environmental benefits. Specific gaps such as breeding areas for endangered species might be identified and if not addressed under the LMMA system could need special protected area approaches. In relation to terrestrial protected areas or other forms of management it may still be beneficial for Environment staff to engage with these issues through the existing CBAM processes of the coastal LMMAS where these are relevant.

178 Tawake et al. 2007, Inglis et al. 1997, Thaman et al. 2005

179 Tawake et al. 2007., Aswani and Hamilton 2004a.

It will be important to strengthen and adapt national and sub-national policy and institutional frameworks in support of ICM/EBM (based on community-driven adaptive management) to ensure robustness to external drivers such as population increases, market pressure, climate change and terrestrial impacts. The strengthening of institutional capacity will require innovative approaches from NGOs and donors, imaginative and tailored institutional structures which may adapt or hybridize traditional or national institutions. Bridges between these and other stakeholders can be built using networks and umbrellas, examples of which are now established in the region[180]. These support networks or umbrellas have proven useful in the advancement of national community based management in Fiji and also Solomon Islands and Micronesia (FLMMA, SILMMA, PIMPAC) and allow for effective partnerships between government and civil society.

A number of agencies have overlapping responsibilities (e.g. environment, fisheries and disaster preparedness/adaptation) which could interface with communities through a single community based adaptive management approach cutting costs and ensuring "holistic" and integrated processes. It would be important to examine how to encourage or at least support interdisciplinary and cross-sectoral approaches in appropriate and sufficiently flexible legal frameworks.

Melanesian countries are still working on the legal backing or support for LMMA approaches. For the moment this support is not essential but will become more important as more sites come on-stream and especially if government departments take over formal responsibilities for implementation.

A fundamental requirement of such legislation would be for it to not to represent a bottle neck in terms of community implementation. This situation occurs already and is holding back community initiative forcing them to depend on external assistance to fulfill requirements. Requirements should be as simple as possible, hopefully in line with products and processes that communities are already preparing as part of planning exercises. In addition these should not be subject to the production of additional regulations or legislation by central government which again would represent a bottle-neck out of the control of communities. Some features of such legislation might include:

- Require a simple management plan covering agreed key points such as major resources, key problems and community agreed solutions. This should be community appropriate e.g. flip chart, matrices, few pages.
- Evidence of minimum criteria met by the plan regarding process (participation of appropriate stakeholders, wider community and time span), content (structure, objectives, simple to understand), context (existing legislation, ecological issues, wider coastal zone, national or ecosystem issues).
- The continued acceptance of Community Plan into registry or national database and its legal status is subject to demonstration of regular community review (e.g. every 3 years).

Meeting international obligations

Several problems emerge when attempting to assess the extent to which Pacific Island countries have met their obligations under international conventions to "effectively manage at least 10% of marine and coastal ecological regions" or to cover at least 20-30% of each marine habitat with strictly protected areas.

Agreement does not seem to exist as to the extent of marine or coastal area to which the commitments refer, possibly because of the lack of complete basic data sets on national marine area (except in the cases of Exclusive Economic Zones and coral reef area). This is an issue that regional agencies may be well placed to help resolve with national governments.

While the dependent territories and associated states maintain a relatively reliable record of marine protected

180 Cinner et al. 2007. Cinner and Aswani 2007, Anderies et al 2004, Ostrom 1990, Berkes 2004, Tawake et al. 2007.

areas the same is most definitely not the case for the independent states. **Most countries do not maintain an up to date national list and hitherto reliance has been on data submitted to the World Database of Protected Areas. Data submitted appears to be extremely variable, generally under-reporting active Community Conserved Areas (CCAs) but, of far greater concern, vastly inflating MMA coverage with inactive or inappropriate sites, particularly in Tonga, PNG and Solomon Islands.** The present study affords the opportunity for countries to incorporate coverage of recently active CCAs while highlighting some nominal protected areas which may require a status review.

Another issue is the extent to which wider managed areas and no-take zones or taboos equate to "effective management" and "strict protection" in the conventions. Indeed this and also the mechanisms and criteria by which extended tracts of land and sea under customary tenure could be considered as CCAs should probably be debated at a high political or whole-of-government level in the context of wider national development agendas.

Fiji may be the only independent country well advanced in extending some sort of management to its inshore areas or reef habitat. For the remaining independent countries the targets appear extremely distant.

Given these countries' other national and international commitments to poverty alleviation and sustainable development it may well be appropriate to examine how wide scale coverage of marine resource management such as in Fiji (and to a lesser extent Samoa) can be achieved. Approaching this piece meal on the basis of individual MPAs would appear to be an insurmountable task as well as producing comparatively little national benefit.

Financial costs of upscaling networks of LMMAs

Examples of the costs involved in running individual or networks of MMAs have been developed in Annex 4 and above. Based on the arguments developed in the preceding section the most cost effective approaches to achieving objectives and targets of food security, poverty alleviation and conservation facing South Pacific countries would be the integration of LMMAs in the national resource management strategies which would include inshore fisheries management, integrated coastal management strategy, disaster preparedness and climate change adaptation components.

Key criteria for such a resource management scenario integrating LMMAs in Melanesia would include:

- Designed to fully integrate into government functions over the medium term
- Decentralized into logistically functional management areas (provinces or similar)
- Highly cost effective with likelihood of sustainable financing
- Staggered or cumulative approach optimizing trickle down or snowballing effects.

Integrating government support for national networks of LMMAs

Government (at various levels) is the appropriate institution to provide the core services required to establish and service managed marine areas over the long term. It makes sense for the Fisheries authority to be a lead organization because they have the largest presence (national and provincial levels) and the most capacity to address the principal motivations of the majority of marine managed areas wherein the communities identify fisheries management as their major priority. Piggy-backing biodiversity conservation onto more economically driven marine resource management appears a strategic approach and Environment departments are well placed to play a supportive role in terms of ensuring consideration of ecosystem wide issues, vulnerable ecosystems and endangered species and carry out essential monitoring as well as issues relating to climate change adaptation.

The most practical investments with potential for long term impact would involve building the capacity of government agencies to provide the long term support mentioned above and, equally importantly, to secure recurrent budgets to do this. **While an ultimate goal might be to ensure government prioritize marine resource management budgets, some sort of conditional trust fund arrangement may be vital to guard against reallocation of essential operating budgets.**

Most governments have established, or are actively considering the establishment of, units appropriate to supporting community based inshore management which would be appropriate starting points. Political will and capacity will be two major challenges but the incentive provided by the international commitments and major funding initiatives may make progress on the former while experiences in Fiji and elsewhere suggest that with time and NGO commitment capacity can be transferred to counterpart government institutions. Fiji and recent Solomon Island experiences suggest that with high level institutional commitment functional partnerships between government and NGOs can be achieved and indeed will be vital.

Decentralizing support for local management

All countries have shown clustered and decentralized approaches to establishment and support of LMMAs. Aside from the ecological functions of such networks there are significant logistical and cost benefits to the approach. Staff time and transport account for major proportions of the costs especially so in island settings with reliance on boat or air travel. Supporting community sites from national and sometimes even provincial capitals is expensive and time consuming.

The definition of optimum management units will be important, criteria should weight logistical, administrative, social and cultural factors as these will facilitate implementation if carefully chosen. These units may correspond with provincial jurisdictions or islands in the context of Vanuatu and Solomon Islands and districts or some provinces in PNG. Practical considerations such as the existence of a functioning provincial fisheries office or similar may be a determining factor.

Decentralization presents challenges for coordination and capacity building and significant use may need to be made of social networks. Potentially NGOs may need to consider partnering or even embedding staff with the relevant government field offices.

Improving cost effectiveness and financeable sustainability

As noted above, Melanesian countries face serious development issues and financial resources are stretched very thin. Government environment and fisheries departments have extremely low budgets relative to the magnitude of the area and challenge they face. For the long term support of LMMAs to be countenanced within the context of recurring government budgets the costs involved must be demonstrably efficient.

Arguably the fundamental tenet of "sustainable financing" is to ensure that object of the financial request is as cost effective as possible. Very few, if any, pilot projects have made explicit reference to seeking cost effective approaches and indeed many pilots have been unjustifiably over-financed with respect to their objectives and their prospects for obtaining future funding.

Based on regional experiences the following cost areas may be considered in efforts to increase cost-effectiveness:

- **Staff costs:** Salaries are one of two major costs for most LMMA projects and in many cases this is one of the most vital budget lines. Achieving the right proportions of field and potentially more expensive technical staff will help to reduce costs. Nationally or regionally located expertise available on demand or accessed through network partners may be more appropriate than keeping experts in-house.

- **Transport:** Fuel prices have increased the pressure on the other major budget item. Decentralization and servicing series of nearby sites in clusters during a single trip are obvious ways of reducing costs. Establishing working relationships with other programmes (health tours, education etc.) for routine trips may allow cost sharing.
- **Living allowances:** In some projects living allowances for staff attending meetings or field trips amount to significant proportions of the budget. Such allowances are extremely sensitive issues to staff but careful consideration might be given to the guidelines for such allowances given their potential to mount up.
- **Equipment:** Most equipment costs are relatively low but there is potential for incurring seemingly low expenses that mount up when upscaling is taken into account. Buoyage or signage of MPAs is a frequent request and at first glance seems reasonable but at the scale of hundreds of MPAs it is a significant and recurring expense that may not be essential.
- **Environmental awareness:** There is scope for reducing the cost of awareness materials and streamlining awareness raising exercises into the planning process as mentioned above. These processes are simple and reliant on little if any technology.
- **Research and external planning:** External research is a comparatively expensive activity; frequently the results are not easily applicable to management or of more interest to external agencies. Research considered as vital and responding to local priorities might be outsourced or performed in partnership with external academic organizations and national research permitting authorities may be able to encourage selection of community priorities.
- **Monitoring:** Scientific monitoring incurs significant cost especially skilled labor and transport. Such monitoring has yet to be proven to be an essential component of LMMA implementation and at a site level perceptual approaches may be far cheaper and less disempowering for communities. For the purposes of central coordination or project evaluation monitoring at selected subsamples of sites may be adequate. Costs of monitoring may potentially be allocated to central or external budgets.
- **Incentives and alternative income generation:** The use of incentives, cash or otherwise, sits ill with customary tenure, empowerment, resilience and the upscaling of LMMA approaches. Use of incentives will likely be counterproductive (leading to "green-mail") and untenable for upscaling and would not seem to be a useful strategy in wider LMMAs.
- **Other opportunities for reducing costs:** An important strategic partnership should be explored in terms of disaster prevention and, more recently, adaptation to climate change initiatives. These programmes require similar community engagement processes to LMMAs and would greatly benefit from the adaptive and regularly reviewed approach advocated for LMMAs. For these initiatives the costs of revisiting communities may be prohibitive but communities may be able to review relevant undertakings or plans as part of routine LMMA adaptive management processes.

Implement gradually and organically

Major national and regional projects have a track record of ambitious scale and large initial wastage of resources. In addition, the large number of coastal communities in Melanesia suggest that if attempts were made to engage directly with all of them costs would soon be astronomical.

A gradual approach aiming to increase the enabling environment for community management and focusing on establishing government (decentralized) capacity through successful large scale examples of LMMA networks would seem to hold the best chances of being both affordable and achievable. Such an approach would be implemented over a medium terms (say 10 years) and:

1. Ensure that policy and legislation are supportive or do not represent an unreasonable hurdle to communities wishing to sustainably manage customarily owned resources. Ensure policy coordination at relevant level (e.g. environment, fisheries, adaptation, disaster preparedness).
2. Provide practical guidance on the options for communities and local authorities to implement community based management.
3. Government, NGOs and other relevant stakeholders agree and coordinate national strategies including decentralized and integrated approaches.
4. Appropriate management units and decentralized responsible officers are defined.
5. Decentralized management units are operationalized through provision of staff and capacity in a staggered fashion i.e. best organized or prepared units/provinces start implementation first followed by others when appropriate.
6. First networks of sites are supported based on community requests/commitment and logistical considerations. Appropriate awareness raising is provided through the media to enable communities to consider implementation by themselves or submit requests for support.
7. Regular stakeholder reviews of progress and adaptation of the approach carried out throught appropriate social networks.

Costing a national approach to LMMAs

The two examples of national approaches available for comparison give some idea of the operations that might be required. Local (decentralized) field staff are supported by centrally located technical experts in guiding interested communities through community planning processes. Communities with established plans are reviewed at agreed intervals (1-3 years) and any major problems arising are responded to as possible. New communities are added to the programme as time and work permits although in Fiji communities may support each other in implementation. A small amount of wastage is accepted as some communities may leave the programme if it does not meet their needs.

The cost per site or village in Samoa and Fiji is US$1,344 and US$800 respectively although on an area basis Fiji is an order of magnitude cheaper. The estimated yearly cost of national support is some US$67,000 for Samoa and US$136,000 for Fiji. Extrapolating for Fiji, the yearly cost of providing the same level of services to all the Fijian Qoliqoli would be in the order of US$300-400,000. The figure may be considerably less than this as it does not take into account that a small proportion of sites have been supported at a far higher cost by other institutions or that costs upon which this is based combine new (more expensive) sites with ongoing support of established sites (cheaper). In addition, decentralization and stream-lining is resulting if far more cost-effective approaches in Kadavu and other Fijian provinces.

However, these costs do not adequately reflect overheads or more general occupancy costs for institutional involvement and do not assume major institutional strengthening or restructure. Factors that may reduce the costs in Fiji relative to the rest of Melanesia is the comparative ease of road access to a bulk of sites and the success of holding multi-village meetings. Neither of these factors appear likely assumptions in the rest of Melanesia.

Other costs that would need to be accounted for are those pertaining to national and international networks and the role played by the Environment Department and other supporting institutions such as the judiciary.

Costs would be reduced to the extent that they may be shared with other government agencies and sectors as discussed. Considering the variables discussed above and allowing for a gradual, organic and decentralized approach it is possible that a sustained investment in the order of 0.1-0.5 million dollars per year over at least a 10 year period would be necessary to establish a national decentralized system of support for community

based adaptive management, somewhat more in PNG. A potential framework for costing the comprehensive national implementation of integrated management and LMMAs in line with the seven steps outlined above is presented in Table 24.

Table 24: An outline framework foTable 24: An outline framework for estimating the cost of a comprehensive national implementation of integrated management and LMMAs.mating the cost of a comprehensive national implementation of integrated management and LMMAs.

	National	Sub-national / province
Initial stages	Policy coordination and legal review	
	National dissemination of policy guidance	Local dissemination of policy guidance
	National networking and coordination (including social network)	Networking and coordination
	Assessment of subnational management units and order of implementation	
	Capacity building of national and subnational key staff	Capacity building of local key government and other staff in first pilot subnational / provincial networks
		Strategic identification of pilot sites/networks and planning
	Provision of technical advice	Implementation of LMMAs in first networks (10-100 sites)
		Follow-up visits to pilot sites (review and problem solving)
	Monitoring and evaluation meetings	Monitoring and evaluation
	Costs: Fisheries, Environment Department and other staff Technical experts Transport and workshops/ meetings Production of awareness materials and media Communications	Costs: Local government and other staff Transport and living allowances Dissemination of awareness materials and media Communications
Ongoing	Provision of technical advice	Ongoing response to problems or requests for assistance in new communities
	Monitoring and evaluation meetings	Monitoring and evaluation
	Replication of approaches in new provinces or sub-national units	Networking and sharing of experiences with other communities and provinces
	Costs: As above	Costs: Core staff and transport budgets Networking

CONCLUSIONS AND RECOMMENDATIONS

The South Pacific has experienced a remarkable proliferation of marine resource management in the last decade carried out by over 500 communities spanning 15 independent countries and territories representing a unique global achievement.

The approaches being developed at national levels make use of existing community strengths in traditional knowledge, customary tenure and governance and combined with a local awareness of the need for action result in what have been most aptly termed Locally Managed Marine Areas (LMMAs). The main driver in most cases is a community desire to maintain or improve livelihoods within a context where conservation and sustainable use are inseparable as part of surviving concepts of traditional environmental stewardship.

The effort of communities and their supporting governmental and non-governmental organizations has resulted in over 12,000 km^2 coming under active management in the independent countries of which more than 1,000 km^2 is "no-take". This progress comes at a time when older models of larger, centrally planned, reserves have failed in almost all cases resulting in the need to review the inclusion of some 14,000 km^2 of such "paper parks" in national and global databases of the region.

- The spread and endurance of these LMMAs is attributable in great part to the perception of communities that benefits are, or are very likely to be, achieved. Such benefits include recovery of natural resources, improved food security, improved governance, access to information and services, health impacts, improved security of tenure, cultural recovery and community organization. Less explicit benefits may also be perceived ranging from exclusion of other stakeholders from fishing areas to the "fringe benefits" of working with outside agencies or even outright incentives.

The increased abundance of target species within closed areas has been quantifiably verified but less scientific evidence has been gathered for other benefits. It is likely that communities perceive some combination of benefits that, together, sum an acceptable return on their investment. Perhaps the major benefit accruing is the realization by communities of the increased control and resilience of the resources upon which they rely afforded by this adaptive management.

Despite difficulties in quantifying the impact of LMMA approaches on livelihoods, the information that is available combined with the absence or failure of alternative approaches strongly supports community based adaptive management as the fundamental building block of integrated island management or ecosystem approaches.

Some of the major innovations that have supported the proliferation of LMMAs have been the operation of clusters of sites supported by regional, national and sub-national umbrellas or social networks. Others include the adoption by support agencies of simple participatory learning and action approaches, the development of more support oriented roles by government agencies, a burgeoning recognition of the importance of cost-effectiveness and the development in some cases of supportive legal frameworks.

Though wide-spread implementation of LMMAs will result in an increase in the number of marine protected areas, concentrating on this aspect alone would be costly and hard to sustain. Significant environmental or fishery benefits from the possible increases in numbers of no-take zones are not likely unless communities address other issues in their wider fishing area and watersheds using a greater range of management tools. Evidence suggests that such integrated approaches are entirely possible and that costs at the pilot stage may feasibly be in the order of hundreds of dollars per community although some of the approaches being piloted seem unrealistically expensive.

Realizing the full potential of local management would best be carried out under the auspices of national or provincial governments in collaboration with civil society to develop cost effective mechanisms for the support and coordination of adaptive management in any and all communities which are experiencing natural resource threats. Such widespread approaches would be necessary to reduce costs and ensure an affordable long term resource management strategy best adapted to achieving not only national commitments to protected areas but also priorities relating to livelihoods such as food security, resilience and adaptation to climate change.

Government and institutional recommendations

- **Enhancing the role of government:** Future support should seek to consolidate the long term role of the various levels government in supporting and coordinating local marine resource management. Such a strategy, ideally decentralized, might be implemented in a gradual or staggered fashion and would require strong collaboration from civil society organizations in achieving government institutional development goals. An important tool will be national or sub-national social networks or support umbrellas.
- **Multi-sector integration in practice**: Fisheries and environmental sectors will need to put into practice effective and on the ground collaboration to support communities in achieving local and national sustainable development priorities. Legislation for inshore fisheries, protected areas and wider environmental management will need to be improved in tandem.
- **Integrated island management as the goal:** Marine protected areas alone will be fragile, costly and unlikely to achieve long-term community or national benefits. The adaptive management processes central to LMMAs should be built on to include ecosystem wide (particularly terrestrial) and sustainable development issues and incorporate climate change adaptation and resilience. Some large scale pilots of such approaches may be appropriate where sufficient experience has not been attained.
- **Enabling environment**: Institutions and legislation will need to develop in a fashion more supportive of community initiative towards sustainable management of resources and remove bureaucratic bottle-necks currently insurmountable by communities.
- **Tenure and traditional governance**: The success of local management approaches hinges largely on traditional tenure and governance systems. Great care should be taken before undermining or reforming these systems which appear vital to sustainable environmental management in the region.
- **Characterize and defend local and cultural approaches**: LMMAs have developed in response to local needs and culture and may often have characteristics such as small size, periodic opening and location determined by social rather than biological factors. International bodies are not necessarily aware of this and these characteristics may require clarification to them before international definitions of Protected Areas or Conservation can be assumed to be regionally applicable.

Financial and economic recommendations

- **Cost effectiveness:** National budgets are amongst the smallest in the world and face considerable demands to meet human development priorities such as health, education and food production. High priority should be placed on cost-effectiveness of environmental management approaches and maximizing the range of livelihood benefits for such approaches to be feasible strategies for government.
- **Sustainable financing:** As an essential prerequisite to sustainable financing strategies, cost effectiveness of marine resource management approaches must be assessed and improved. Long term government budgetary support for inter-linked approaches that build on community management must be actively sought. Trust funds and corresponding legal contracts may be able to play a crucial role in ensuring the constant and long term financing of such core government activities and may be able to safeguard against likely donor fatigue.

- **Debunking alternative income generation**: While there is evidence to suggest that wide-scale support of local resource management will improve livelihoods in terms of food security and resilience there is little evidence that most "income generation projects" are viable in the long term. As such approaches often serve as an unsustainable incentive which deter or distract communities from more effective resource management they should not be automatically accepted in the resource management tool-kit.

Operational and implementation recommendations

- **Appropriate monitoring:** A process of ongoing community discussion and review of progress seems essential to community based adaptive management. However, quantitative and scientific monitoring has not met expectations at the community level to date and given its cost and reliance on external expertise should not be promoted without first testing and discarding simpler (e.g. perceptual) approaches reliant on existing community knowledge and expertise. Monitoring at a national level will be necessary for coordination but again this should be designed bearing in mind cost and simplicity of implementation to provide results useful to decision-makers.
- **Improve and enhance participatory processes:** Ongoing evaluation of techniques and processes used to promote and support community management should be performed. Issues that may need particular attention include community involvement and empowerment, development of appropriate mixes of traditional and national governance and marine tenure in Western Melanesia.
- **Research needs**: Community members are key decision-makers and resource managers. Researchers and technical institutions urgently need to improve processes to identify community priority information needs and in ensuring necessary information reaches communities in a timely and useable fashion.

The Pacific Islands nations are facing potentially apocalyptic challenges in terms of mounting pressures on finite natural resources, burgeoning populations and adaptation to the far-reaching impacts of climate change. The lessons learned in achieving the wide proliferation of locally managed marine areas will be key to adopting viable strategies for surmounting these challenges but only if focus can be widened to encompass their full potential as building blocks for integrated island management in support of resilient Pacific Island communities.

BIBLIOGRAPHY

Aalbersberg, B., A. Tawake and T. Parras. 2005. Village by village: recovering Fiji's coastal fisheries. In World Resources 2005: the wealth of the poor: managing ecosystems to fight poverty. World Resources Institute, Washington D.C. 144-152.

Abesamis, R. A., and G. R. Russ. 2005. Density-dependent spillover from a marine reserve: long-term evidence. Ecol. Appl. 15:1798–1812.

ACMCA Management Committee, 2002. The Arnavon Community-Managed Conservation Area Management Plan. TNC Arnavon CMCA Report Series.

ADB 2005. Toward a New Pacific Regionalism. Pacific Studies Series. http://www.adb.org/Documents/Reports/Pacific-Regionalism/default.asp

Aitaro J. et al. 2007. Lessons for Pacific Island environmental initiatives : experiences from International Waters Project National Coordinators. IWP – Pacific Technical report 44. SPREP, Apia. Samoa.

Anderies, J. M., M. A. Janssen, and E. Ostrom. 2004. A framework to analyze the robustness of social-ecological systems from an institutional perspective. Ecology and Society 9(1): 18.

Anderson, J. A. and C. C. Mees, 1999. The performance of customary marine tenure in the management of community fishery resources in Melanesia. Final Technical Report to the UK Department for International Development, MRAG Ltd., London.

Aswani, S. and R. J. Hamilton. 2004a. The value of many small vs. few large marine protected areas in the Western Solomons. Traditional Marine Resource Management and Knowledge Information Bulletin 16: 3-14

Aswani, S. and R.J. Hamilton. 2004b. Integrating indigenous ecological knowledge and customary sea tenure with marine science and social science for conservation of bumphead parrotfish (Bolbometopon muricatum) in the Roviana Lagoon, Solomon Islands. Environmental Conservation 31, 69–83.

Aswani, S., Albert, S., Sabetian, A. and Furusawa, T. 2007. Customary and management as precautionary and adaptive principles for protecting coral reefs in Oceania. Coral Reefs 26(4): 1009-1021.

Aswani, S. and P. Weiant,. 2004. Scientific evaluation in women's participatory management: monitoring marine invertebrate refugia in the Solomon Islands. Human Organization 63, 301–319.

AusAID 2000. Increasing rural incomes: an evaluation of three rural sector projects in Samoa. Quality Assurance Series No. 19 July 2000.

AusAID 2008. Making Land Work: Reconciling customary land and development in the Pacific. (2 Vols). AusAID Pacific Land Program, Canberra. http://www.AusAID.gov.au/publications/pubout.cfm?ID=3363_9223_6836_1452_8140&Type=PubKARD

AusAID 2008. Pacific Economic Survey – connecting the region. Australian Agency for International Development (AusAID) Canberra. www.pacificsurvey.org

AusAID, 2007. Tonga Fisheries Project.Milestone 22 & 25; Progress Towards the Establishment of Marine Protected Areas. Prepared by Hassall & Associates International Pty Ltd in Association with ANZDEC. 29pp + 104pp Annexes.

Axford, J. C. 2007. What constitutes success in Pacific Island community conserved areas? Thesis submitted for the degree of Doctor of Philosophy at University of Queensland.

Axford, J. C., M. T. Hockings, and R. W. Carter. 2008. What constitutes success in Pacific island community conserved areas?. Ecology and Society 13(2): 45.

Baines, G. Duguman J and P. Johnston. 2006. Evaluation of Milne Bay Community-based Marine and Coastal and Marine Conservation Project – Terminal Evaluation of Phase I.

Baines, G. P Hunnam, MJ Rivers and B. Watson. 2002. South Pacific Biodiversity Conservation Programme (SPBCP) Terminal Evaluation Mission Final Report. UNDP

Baird, B.E., M.A. Miller-Hensen and B.X. Semmens. 1999. Analyzing California's Marine Managed Areas. CalCOFI Rep., Vol. 40: 67-70

Balmford, A., P. Gravestock, N. Hockley., C. J. McClean and C. M. Roberts. 2004. The Worldwide Costs of Marine Protected Areas. Proceedings of the National Academy of Science. Pp 9694-9697

BCN 1999. Final Stories from the Field. Biodiversity Conservation Network, Biodiversity Support Program, Washington DC, USA.

Bell JD, BD Ratner, I Stobutzki, J Oliver. 2006. Addressing the coral reef crisis in developing countries. Ocean & Coastal Management. Volume 49, Issue 12, Pages 976-985

Bell, J. 2007. Fish – A Cornerstone of Future Food Security for The Pacific. SPC Women in Fisheries Information Bulletin #17, 33-34

Benet, A. 2005. Réserve de Biosphère des Tuamotu – Commune de Fakarava – Archipel des Tuamotu – Polynésie française. Plan De Gestion De L'espace Maritime (P.G.E.M) Des Atolls De La Commune De Fakarava (Aratika, Kauehi, Fakarava, Niau, Raraka, Taiaro Et Toau) – Archipel Des Tuamotu-Polynesie Française – Rapport intermédiaire N° 2 Convention N° 4.0007/MRN/SPE du 20 Août 2004

Benzaken, D., S. Miller-Taei and L. Wood, 2007. Status of policy and target development and implementation for marine protected areas/marine managed areas in the Pacific Islands Region – a preliminary assessment and future directions. SPREP

Berkes, F. 2004. Rethinking Community-Based Conservation. Conservation Biology 18:621-630.

Bonito, V. Undated. Koroinasau / Korolevu-i-wai Qoliqoli Trust : a tool for resource management and indigenous community development.

Borrini-Feyerabend, G., A. Kothari and G. Oviedo 2004, Indigenous and Local Communities and Protected Areas. Towards equity and enhanced conservation, IUCN/WCPA Best Practice Series, 11, Gland (Switzerland) and Cambridge (United Kingdom)

CELCOR 2008. Report on PNGs Fisheries, Coastal and Marine Legislation and Policy Gap Analysis Project, BSSE Programme, CELCOR

Chambers, R. 1992. Rural Appraisal: Rapid, relaxed and participatory. Institute of Development Studies. Discussion Paper 311.

Chape S. 2006. Review of Environmental Issues in the Pacific Region and the Role of the Pacific Regional Environment Programme. Workshop and symposium on Collaboration for sustainable development of the Pacific Islands: Towards effective e-learning systems on environment. 27-28 February 2006. Okinawa, Japan

Charles, T., R. Hilborn, K. De Meyer, P. Gravestock. 2008. What does your MPA cost?: considering the various costs of MPAs to stakeholders and management. MPA News Vol. 10, No. 1 July 2008.

Chatterton, P. , R. Yamuna, L. Higgins-Zogib, N. Mitchell, J. Sabi, W. Jano. In Press. An Assessment of the Effectiveness of Papua New Guinea's Protected Areas Using WWF's RAPPAM Methodology. WWF, DEC, TNC.

Cinner, J, Marnane, MJ, McClanahan, TR and Almany, GR. 2006. Periodic closures as adaptive coral reef management in the Indo-Pacific. Ecology and Society 11(1): 31.

Cinner, J., S. Sutton, T. Bond (2007) Socioeconomic thresholds that affect use of customary fisheries management tools. Conservation Biology: online early articles.

Cinner, JE and Aswani, S. 2007. Integrating customary management into marine conservation. Biological Conservation 140(3-4): 201-216.

Comley J., R. Vave, A. Cakacaka, S. Meo, and A. Tawake. 2007. The Effectiveness of Different Taxonomic Survey Intensities Represented by Indicator Fish Species in Understanding the Effects of MPA Designation on Fish Population Abundance in a Fijian Context. CRISP-IRD/USP Workshop. IAS Technical Report No. 2007/1

Commission of the European Communities, 2000. Communication from the Commission to the Council and the European Parliament – Fisheries and Poverty Reduction. Brussels, 8.11.2000. COM(2000) 724 final.

Dalzell, P. and D. Schug. 2001. Synopsis of information relating to sustainable coastal fisheries. SPREP -Strategic action programme for international waters of the Pacific islands region. South Pacific Regional Environment Programme, Apia, Samoa.

Dudley, N. (Editor) 2008. Guidelines for Applying Protected Area Management Categories. Gland, Switzerland: IUCN. x + 86pp.

Fa'asili U, Vunisea A, Ledua E et al (2002) Proposed Community-Based Fisheries Management Programme for the Republic Fiji 2002. Field Report No. 11, Secretariat of the Pacific Community, New Caledonia. 37pp.

Fa'asili U. and A. Taua. 2001. Review of the Village Fisheries Management Plans of the Extension Programme in Samoa. Field Report No. 7" .

Fedder, B. and H. Govan. 2007. Assessment of Global Marine Biodiversity Indicators for the Global Environment Facility Resource Allocation Framework (GEF RAF). A summary of findings – Report for Foundation of the Peoples of the South pacific International, Suva Fiji.

Fenner, D., M. Speicher, S. Gulick, G. Aeby, S.W. Cooper Aletto, P. Anderson, B. Carroll, E.M. DiDonato, G. Didonato, V. Farmer, D. Fenner, J. Gove, S. Gulick, P. Houk, E. Lundblad, M.O. Nadon, F. Riolo, M. Sabater, R. Schroeder, M. Speicher, C. Tuitele, A.P. Tagarino, S. Vaitautolu, E. Vaoli, B. Vargas-Angel, and P.S. Vroom. 2008. The State of Coral Reef Ecosystems of American Samoa. Pp. 307-351. In: J. Waddell (ed.), The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008. NOAA Technical Memorandum NOS NCCOS. NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team. Silver Spring, MD.

Feral, F. 2008. Gouvernance des Aires Marines Protegees pour la Gestion Durable de la Biodiversite et des usages côtiers. Rapport De Synthese Sur La Mission Gaius En Polynesie Francaise. Université de Perpignan

Fingleton, J. (ed.), 2005. 'Privatising Land in the Pacific: A Defence of Customary Tenures.' Canberra: Australia Institute (Discussion Paper 80).

Fisk, D. 2007a. Review of monitoring practices from FSPI and affiliate organizations. Draft report to FSPI, FSPI, Suva, Fiji

Fisk, D. 2007b. Niue sustainable coastal fisheries pilot project : Community-based monitoring. Apia, Samoa : SPREP. IWP-Pacific Technical report; no.40

Foale, S. 2001. Where's our development? Landowner aspirations and environmentalist agendas in Western Solomon Islands, The Asia Pacific Journal of Anthropology 2(2): 44-67.

Foale, S. 2008. A preliminary exploration of relationships among fishery management, food security, and the Millennium Development Goals in Melanesia. SPC Traditional Marine Resource Management and Knowledge Information Bulletin #24 – December 2008. 3-8.

Foale, S. J. and B. Manele. 2004. Social and political barriers to the use of Marine Protected Areas for conservation and fishery management in Melanesia. Asia Pacific Viewpoint 45 (3): 373-386.

Fox, A. Tiraa, A. Raaymakers, S. 2007. Terminal Evaluation GEF/UNDP/SPREP Strategic Action Program For The International Waters Of The Pacific Small Island Developing States (Ras/98/G32) Final Report.

FSPI (Foundation of the Peoples of the South Pacific International), Annual Reports 2004-2006 (www.fspi.org.fj).

FSPI 2003. Community Governace in the Pacific: Initial findings Report for the Asian Development Bank. RETA 6065. Foundation of the Peoples of the South Pacific International, Suva Fiji.

Gabrié C., Eynaudi A., Cheminée A., 2007. Les récifs coralliens protégées de l'outre mer français. Ministère de l'Ecologie et du développement durable et Ministère de l'Outre Mer.102 p.

Gillett R and C. Lightfoot 2002. The contribution of fisheries to the economies of Pacific island countries. Asian Development Bank, Manila. ww.adb.org/documents/reports/contribution_fisheries_pacific_economies /default.asp

Gillett R., G. Preston, W. Nash, H. Govan, T. Adams, and M. Lam. 2008. Livelihood diversification as a marine resource management tool in the Pacific Islands: Lessons learned. SPC Fisheries Newsletter #125 – April/June 2008. 32-39.

Gillett, R, G. Preston, W. Nash, H. Govan, T. Adams and M. Lam. 2007. Livelihood Diversification as a Marine Resource Management Tool in the Pacific Islands: Lessons Learned. Project by WFC/SPC. Paper commissioned by WorldFish.

Goldberg, J., K. Adams, J. Albert, J. Asher, P. Brown, V. Brown, D. Burdick, B. Carroll, P. Craig, D. Fenner, C. Fillmed, V. Fread, M. Gawel, A. George, Y. Golbuu, L. Goldman, C. Graham, A. Hall, M. Hasurmai, L. Jacob, D. Jacobson, E. Joseph, J. Kenyon, W. Kostka, T. Leberer, M. Luckymis, E. Lundblad, S. Malakai, J. Maragos, A. Marcus, S. Marino, D. Mathias, J. Mcilwain, J. Miller, D. Minton, M. Nadon, S. Palik, N. Pioppi, L. Raymundo, B. Richards, M. Sabater, R. Schroeder, P. Schupp, E. Smith, T. Zgliczynski and B. Zgliczynski. 2008. Status of Coral Reef Resources in Micronesia and American Samoa. In: Wilkinson, C. (ed.). Status of Coral Reefs of the World: 2008. Australian Institute for Marine Science, Australia. p199-212.

Gombos, M., J., R. Oram, and S. Vaitautolu. 2007. American Samoa Coral Reef MPA Summary. pp. 11-25. In Wusinich-Mendez, D. and C. Trappe (ed.), 2007. Report on the Status of Marine Protected Areas in Coral Reef Ecosystems of the United States Volume 1: Marine Protected Areas Managed by U.S. States, Territories, and Commonwealths: 2007. NOAA Technical Memorandum CRCP 2. NOAA Coral Reef Conservation Program. Silver Spring, MD. 129 pp. +Appendices.

Gordon, R.G., Jr. (ed.), 2005. Ethnologue: Languages of the World, Fifteenth edition. Dallas, Tex.: SIL International. Online version: http://www.ethnologue.com/

Govan, H. 1993. Participatory research in giant clam farming. Naga, The ICLARM Quarterly, January, p8-10.

Govan, H. 1997. Building on local culture for development. in Environment and development in the Pacific. Burt, B. and C. Clerk (eds.) Earthscan/Blackwell Academic Publishers.

Govan, H. 1999a. Empowering local communities to reverse the decline of coral reef ecosystems in Fiji. Foundation of the Peoples of the South Pacific, Fiji, Suva. 13pp

Govan, H. 1999b. Process timetable and workshop contents: Community-based management of coral reefs. Foundation of the Peoples of the South Pacific, Fiji, Suva. 10pp

Govan, H. 2005. FSPI Communities and Coasts Programme: Rationale and Strategy Concept Note. FSPI, Suva, Fiji. www.fspi.org.fj

Govan, H. 2008. Overview: Reclaiming "Protected Areas" as a Livelihood Tool for Pacific Island People in: Cohen, P., A.D. Valemei and H. Govan. 2008. Annotated Bibliography on Socio-economic and Ecological Impacts of Marine Protected Areas in Pacific Island Countries. WorldFish Bibliography No. 1870. The WorldFish Center, Penang, Malaysia. 36 pp.

Govan, H. Tawake, A. and Tabunakawai, K. 2006. Community-based marine resource management in the South Pacific. PARKS Vol 16 No 1, 21-27. 63-67.

Govan, H., A. Tawake, J. Comley, R. Vave. 2008b. Fiji biological monitoring update and proposed next steps. Locally Managed Marine Area Network. USP-IAS internal document, 20 June 2008

Govan, H., Aalbersberg, W., Tawake, A., and Parks, J. 2008a. Locally-Managed Marine Areas: A guide to supporting Community-Based Adaptive Management. The Locally-Managed Marine Area Network. (http://www.lmmanetwork.org)

Govan, H., Alifereti Tawake , Kesaia Tabunakawai , Sylvia George, Semese Alefaio, Shauna Troniak, Tevi Maltali, Hugo Tafea, Hugh Walton, Christopher Bartlett, Aaron Jenkins. In press. Community Conserved Areas: A review of status & needs in Melanesia and Polynesia. ICCA regional review for CENESTA /TILCEPA /TGER /IUCN/ GEF-SGP.

Govan, H., P.V. Nichols and H. Tafea. 1988. Giant clam resource investigations in Solomon Islands. In Copland, J.W., and Lucas, J.S. Giant clams in Asia and the Pacific. ACIAR Monograph No. 9: 54-57.

Govan, H., S. Wale, H. Tafea, P. Ramohia, E. Austin-Delaney, S. Rena Gereva, T. Maltali, T. Betero, S. Alefaio, F. Robinson and W. Sivoi. 2005. "Working with communities to improve coastal livelihoods: Solomon Islands, Fiji, Tuvalu, Vanuatu and Kiribati", paper presented at IMPAC meeting, Geelong, October 2005.

Graham, B. 2005. Trust Funds in the Pacific: their role and future. ADB Pacific Studies Series. http://www.adb.org/Documents/Reports/Trust-Funds-Pacific/trust-funds.pdf

Green, A., Lokani, P., Sheppard, S., Almany, J., Keu, S., Aitsi, J., Warku Karvon, J., Hamilton, R & Lipsett-Moore, G. 2007 Scientific Design of a Resilient Network of Marine Protected Areas, Kimbe Bay, West New Britain, Papua New Guinea. TNC Pacific Island Countries Report No. 2/07.

Halpern, B.S. and Warner, R.R. 2003. Matching marine reserve design to reserve objectives. Proceedings of the Royal Society of London, Series B, 270, 1871–1878.

Hamilton, R., Ramohia, P., Hughes, A., Siota, C., Kere, N., Giningele, M., Kereseka, J., Taniveke, F., Tanito, N., Atu, W. and L. Tanavalu, 2007. Post-Tsunami Assessment of Zinoa Marine Conservation Area, South Choiseul, Solomon Islands. TNC Pacific Island Countries Report No. 4/07.

Harmon D. and J. Loh. 2004. A Global Index of Biocultural Diversity. Discussion Paper for the International Congress on Ethnobiology. University of Kent, U.K., June 2004

Healy, J., 2006. Bismarck Solomon Seas Ecoregion – Solomon Islands' Fisheries, Marine and Coastal Legislation and Policy Gap Analysis. WWF, Solomon Islands.

Hickey, F. R. 2006. Traditional Marine Resource Management in Vanuatu: Acknowledging, Supporting and Strengthening Indigenous Management Systems. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 20: 11–23.

Hickey, F.R. 2008. Nearshore fisheries and human development in Vanuatu and other parts of Melanesia. SPC Traditional Marine Resource Management and Knowledge Information Bulletin #24 – December 2008. 9-18.

Hilborn, R., Stokes, K. Maguire, J.J., Smith, A.D.M., Botsford, L.W., Mangel, M., Orensanz, J., Parma, A., ,Rice, J., Bell, J.. Cochrane, K.L., Garcia, S.,. Hall, S.J.,. Kirkwood, G.P., Sainsbury, K., Stefansson, G., Walters, C. J. 2004. When can marine reserves improve fisheries management? Ocean and Coastal Management. 47/3-4 pp. 197-205.

Hoffmann, T. C. (2002) 'The Reimplementation of the Ra'ui: Coral Reef Management in Rarotonga, Cook Islands', Coastal Management. 30:4, 401 – 418

Huber M, and K. McGregor, 2002. A synopsis of information relating to marine protected areas. IWP Technical Report 2002/01. The International Waters Programme, Apia: Secretariat of the Pacific Regional Environment Programme; 2002. 132pp.

Hubert, A. 2007. Utilisation de la perception des pêcheurs dans la gestion participative des ressources: Etude de cas à Navukavu (Fidji) – Rapport final. Composante 2A – Projet 2A2 : Amélioration de la connaissance et des modalités de gestion des écosystèmes coralliens. (http://crisponline.info/Portals/1/PDF/C2A2_Rap_methodo_Hubert.pdf)

Hughes, H. 2003, 'Aid has failed the Pacific', Issues Analysis, No. 33, Centre for Independent Studies, Sydney.

Hughes, H. 2004b, 'The Pacific is Viable!' Issues Analysis, No. 53, Centre for Independent Studies, Sydney. http://www.cis.org.au/issue_analysis/ia53/ia53.pdf

Hviding, E. 1996. Guardians of Marovo Lagoon: practice, place, and politics in maritime Melanesia. Pacific Islands Monograph Series, 14. Honolulu: University of Hawai'I Press.

Inglis, A., H. Govan and S. Guy. 1997. Local voices to the surface: participatory Coastal Zone Management in the Solway Firth. PLA Notes 30.

IUCN-WCPA 2008. Establishing Marine Protected Area Networks—Making It Happen. Washington, D.C.: IUCN-WCPA, National Oceanic and Atmospheric Administration and The Nature Conservancy. 118 p.

Jenkins A.P. and G. Kula. 2000. Marine Protected Areas in Papua New Guinea. Chapter 7 in: Munday PL. (ed) The Status of Coral Reefs in Papua New Guinea. Global Coral Reef Monitoring Network. Australian Institute of Marine Science. Townville. 104pp.

Jenkins, A.P. 2008. Ecosystem Based Management for holistic conservation and development: An emerging Pacific Islands model from Fiji. Presentation from the Water Pavilion at the IUCN World Conservation Congress, Barcelona 2008.

Jenkins, A.P., C.L. Jenkins and J.B. Reynolds. 2007. Successes and challenges of managing coral reefs in Papua New Guinea through locally managed marine areas. Alternate Visions LLC. 7 pp. Accessed 10 June 2008. http://www.alternatevisions.org.

Johannes R.E. 1978. Traditional marine conservation methods in Oceania and their demise. Annual Review of Ecology and Systematics 9:349–364.

Johannes R. E. and F. R. Hickey. 2004. Evolution of village-based marine resource management in Vanuatu between 1993 and 2001. Coastal region and small island papers 15, UNESCO, Paris, 48 pp.

Johannes, R. E. 1981. Words of the Lagoon: Fishing and Marine Lore in the Palau District of Micronesia. Berkeley, University of California Press.

Johannes, R. E. 1998. The case for data-less marine resource management: examples from tropical nearshore finfisheries. Trends in Ecology and Evolution 13(6): 243-246.

Johannes, R. E. 2002. The Renaissance of Community-Based Marine Resource Management in Oceania. Annu. Rev. Ecol. Syst. 33:317–40

Kaufmann, D, A. Kraay and M. Mastruzzi. 2007. Governance Matters VI: Governance Indicators for 1996-2006 (July 2007). World Bank Policy Research Working Paper No. 4280 Available at SSRN: http://ssrn.com/abstract=999979

Kelleher, G., and R. Kenchington. 1992. Guidelines for Establishing Marine Protected Areas. A Marine Conservation and Development Report. World Conservation Union (IUCN), Gland, Switzerland.

Kinch, J. 2002. Giant Clams: Their Status and Trade in the Milne Bay Province, Papua New Guinea. Traffic Bulletin. 19 (2): 67-75.

Kinch, J. 2006. Final Evaluation – European Commission's FSPI Coral Gardens Initiative.

Kinch, J. in press. From Prehistoric to Present: Giant Clam (Tridacnidae) use in Papua New Guinea. British Archaeological Reports International Series.

King, M. and L. Lambeth. 2000. Fisheries Management by Communities: A Manual on Promoting the Management of Subsistence Fisheries by Pacific Island Communities.Noumea, New Caledonia: Secretariat of the Pacific Community, 2000. 87pp

Kuemlangan, B. 2004. Creating legal space for community-based fisheries and customary marine tenure in the Pacific: issues and opportunities. FishCode Review. No. 7 (En). Rome, FAO. 2004. 65p.

Lal B. and K. Fortune, editors. 2000. The Pacific Islands: An Encyclopedia. University of Hawai'i Press.

Lal, P. and A. Cerelala, 2006. Financial and Economic Analysis of Wild and Cultured live Coral and Live Rock in Fiji. A report for FSPI and SPREP, Suva and Apia.

Lal, P. and J. Kinch, 2006. Financial Analysis of Wild and Cultured live Coral and Live Rock in Solomon Islands. A report for FSPI and SPREP, Suva and Apia.

Lal, P.N. and M. Keen. 2002. Economic Considerations in Community Based Project Planning and implementation IWP Technical Report 5. SPREP, Apia, Samoa.

Lambeth L. and P. Watt. 2004. Community-Based Management: Training Manual For Workers Involved in Community-Based Fisheries Management. Student training manual developed for the Kavieng Community-based Fisheries Management Course 25 Nov 1 – Nov 12 2004 based on the Fisheries Extension Manual developed by the Samoa Fisheries Extension and Training Project.

Lane, M.B. 2006a. The governance of coastal resources in Fiji : an analysis of the strategic issues. IWP – Pacific Technical report 20. SPREP, Apia. Samoa

Lane, M.B. 2006b. Evaluating the governance of coastal resources and environments in Vanuatu. IWP – Pacific Technical report 24. SPREP, Apia. Samoa

Lane, M.B. 2006c. Coastal governance in Solomon Islands. : an evaluation of the strategic governance issues relating to coastal management. IWP – Pacific Technical report 29. SPREP, Apia. Samoa.

Lees, A. and S. Siwatibau. 2007. Review and Analysis of Fiji's Conservation Sector. The Austral Foundation. (www.australfoundation.org)

Leisher, C., van Beukering, P., Scherl, L.M. 2007. Nature's Investment Bank: How Marine Protected Areas Contribute to Poverty Reduction, 43 pp., The Nature Conservancy / WWF International

Lipsett-Moore, G., Hinchley, D., Sapul, A., Paiva, F., Aitsi, J., Ulae, G., Muge, C., Ulaiwi, W. and S. Sheppard. 2006. Guidelines for a Community-Based Planning Process, Kimbe Bay MPA Network, Kimbe Bay, West New Britain, Papua New Guinea. TNC Pacific Island Countries Report No. 2/07.

LMMA (Locally Managed Marine Area network), Annual Report 2006. (www.lmmanetwork.org)

LMMA (Locally Managed Marine Area network), Annual Report 2007. (www.lmmanetwork.org)

Lockwood, M., G. Worboys and A. Kothari. 2006. Managing Protected Areas – a global guide. Earthscan

Loh J and D. Harmon 2005. A global index of biocultural diversity. Ecol. Indic. 5(3):231–41.

Lutchman, I. (2005). Marine Protected Areas: Benefits and Costs for Islands, WWF the Netherlands.

Mahanty S and N Stacey. 2004. Collaborating for sustainability: a resource kit for facilitators of participatory natural resource management in the Pacific. Apia: South Pacific Regional Environment Programme; 241pp.

McClanahan, TR, Marnane, MJ, Cinner, JE and Kiene, WE 2006. A comparison of marine protected areas and alternative approaches to coral-reef management. Current Biology 16(14): 1408-1413.

McDonald, J. 2006. Marine resource management and conservation in Solomon Islands: roles, responsibilities and opportunities. Secretariat of the Pacific Regional Environment Programme, Honiara, Solomon Islands. 24 pp.

McIntyre, M. 2005. Pacific Environment Outlook. UNEP/SPREP. United Nations Environment Programme and the Secretariat of the Pacific Regional Environment Programme.

MCS 2008, Marine Conservation Section Six Months Progress Report, January – June 2008. MNRE-DEC, Samoa.

Mogina, J. 2008. Mama Graun Protected Area grant program. Unpublished.

MPA News Vol. 9, No. 10 May 2008

Munro, J.L. and S. T. Fakahau, 1992. Management of coastal fishery resources. Pacific Islands Forum Fisherie. Honiara, Solomon Islands. 15pp. FFA report 92/68.

NZAID 2002. Towards a strategy for the Pacific Region. New Zealand Agency For International Development (NZAID).

O'Garra, T. 2007a. Estimating the Total Value of the Navakavu Locally Managed Marine Area, Final Report, Coral Reef Initiative for the South Pacific (CRISP) Programme, University of the South Pacific, May 2007. Available on www.crisponline.net

O'Garra, T. 2007b. Supplementary livelihood options for Pacific Island communities: a review of experiences. Foundation of the Peoples of the South Pacific International, Suva, Fiji. www.fspi.org.fj

Ostrom, E. 1990. Governing the commons. The evolution of institutions for collective action. Cambridge University Press, New York, New York, USA.

Parks J. E., 1997. The Utility of Using Participatory Aquatic Resource Transect (PART) Technique across Freshwater and Nearshore Marine Ecosystems in Community-based Conservation Efforts. Proceedings of the International Environmental Conference, Harvard, USA.

Parks, J. E. and N. Salafsky (eds). (2001). Fish for the Future? A Collaborative Test of Locally Managed Marine Areas as a Biodiversity Conservation and Fisheries Management Tool in the Indo-Pacific Region: Report on the Initiation of a Learning Portfolio. World Resources Institute and Foundations of Success. Available online at http://www.lmmanetwork.org/pdfs/fish_for_the_future.pdf

Pere Community 2008. Pere Environment and Conservation Area Management Plan, Draft.

Pomeroy, Robert, John Parks, Richard Pollnac, Tammy Campson, Emmanuel Genio, Cliff Marlessy, Elizabeth Holle, Michael Pido, Ayut Nissapa, Somsak Boromthanarat and Nguyen Thu Hie. 2007. Fish Wars: Conflict and Collaboration in Fisheries Management in Southeast Asia. Marine Policy. 31(6):645-656.

Preston G.L. 2005. Review of fisheries management issues and regimes in the Pacific Islands Region IWP-Pacific Technical Report (International Waters Project) no. 17. SPREP, Apia. Samoa.

Reti, I and H. Sullivan. 2005. Samoa Marine Biodiversity Protection And Management Project – GEF Medium Sized Project Implementation Completion Report. TF022674. Final Report. January 2005

Roberts, C.M. and J.P. Hawkins. 2000. Fully-protected marine reserves: a guide. WWF Endangered Seas Campaign, 1250 24th Street, NW, Washington, DC 20037, USA and Environment Department, University of York, York, YO10 5DD, UK.

Rowe, A. 2007. Review of the LMMA Network. Draft Final report.

Ruddle K. 1994. A Guide to the Literature on Traditional Community-based Fishery Management in the Asia–Pacific Tropics. Fisheries Circular No. 869, FIPP/C869. FAO, Rome.

Ruddle, K. 2008. Reconsidering the Contribution of Fisheries to Society and Millennium Development Goals. In: K. Tsukamoto, T. Kawamura, T. Takeuchi, T. D. Beard, Jr. and M. J. Kaiser, eds. Fisheries for Global Welfare and Environment, 5th World Fisheries Congress 2008, pp. 399–411.

Ruddle, K. and F.R. Hickey. 2008. Accounting for the mismanagement of tropical nearshore fisheries. Environment, Development and Sustainability. 565-589

Russ, G.R, Alcala A.C., Maypa A.P., Calumpong H.P. and White A.T. 2004. Marine reserve benefits local fishers. Ecological Applications 14(2), 597–606

Sabetian, A and Foale, S. 2006. Evolution of the Artisanal fisher; case-studies from Solomon Islands and Papua New Guinea. SPC Traditional Marine Resource Management and Knowledge Information Bulletin 20: 3-10.

Sano, Y. 2008. The role of social capital in a common property resource system in coastal areas: A case study of community-based coastal resource management in Fiji. SPC Traditional Marine Resource Management and Knowledge Information Bulletin #24. 19-32.

Saul E. and Tiraa, A. 2004. Protected natural areas in the Cook Islands within a proposed national system. Cook Islands National Biodiversity Strategy Action Plan. Unpub.

Seidel, H. 2009. Evaluating the role of science in Community Based Adaptive Management of Coastal Resources in Fiji. MSc. Thesis, University of Bremen, Germany.

Seymour, F.J. 1994. 'Are Successful Community-based Conservation Projects Designed or Discovered?' in Natural Connections: Perspectives in Community-based Conservation. D. Western and M. Wright. (eds.). Washington, D.C., Island Press: pp. 472-498Somare, M., The Grand Chief Right Honourable, Gcl, Gcmg, Ch, Cf, Kst.J Prime Minister Of Papua New Guinea & Outgoing Chairman Of The Pacific Islands Forum, The 37th Pacific Islands Forum, Fiji, 24 – 25 October 2006 (speech) http://www.pm.gov.pg/pmsoffice/PMsoffice.nsf/pages/C996DAF49D5F95E94A257240001F95C2?OpenDocument

Spalding M.D., L. Fish, and L.J. Wood. 2008. Toward representative protection of the world's coasts and oceans—progress, gaps, and opportunities Conservation Letters 1 () 217–226

Spalding MD, Ravilious C, Green EP (2001) World Atlas of Coral Reefs. University of California Press, Berkeley, USA.

Sykes, H. and C. Reddy. 2008. Waitabu Marine Park – Celebrating 10 years of Marine Protection. 10 year Anniversary Status Report, February 2008, Waitabu Village, Taveuni Island, Fiji.

Tawake, A. 2007. Scaling-Up Networks of Locally Managed Marine Areas (LMMAs) to Island wide Ecosystem Management while Decentralizing the Effort of Fiji LMMA Network and its Implementation from National to Provincial Levels. A Kadavu Yaubula Management Support Team (KYMST) Case study Draft.

Tawake, A., J. Parks, P. Radidedike, W. Aalbersberg, V. Vuki and N. Salafsky. 2001. Harvesting data and clams, Conservation Biology in Practice 2(4): 32–35.

Thaman, B., D. Robadue and G. Ricci. 2005. Strengthening a Nested System of Coastal Management in Fiji: Progress and Lessons Learned Towards Integrated Coastal Management on the Coral Coast and their Implications for National Policy. A joint project between the Government of Fiji, Institute of Applied Sciences, University of the South Pacific and Coastal Resources Center, University of Rhode Island. Unpublished report.

Thomas, L. 2007. Money Grows on Trees: Valuing and Sustaining Natural Resources in Pacific Island Countries. A report prepared for TNC, PIFS and SPREP. TNC Pacific Island Countries Report No. 3/07.

Tiraa, A. 2006. Ra'ui in the Cook Islands – today's context in Rarotonga. SPC Traditional Marine Resource Management and Knowledge Information Bulletin #19 – April 2006

Tortell, P. 2007. Review Of The Action Strategy For Nature Conservation In The Pacific Island Region 2003-2007. Reports of the Roundtable Prepared for the 8th Regional Conference on Protected Areas and Nature Conservation. Report 1: progress achieved towards the objectives of the action strategy during the past five years.

UNDP 2007. Human Development Report 2007/2008. United Nations Development Programme.

UNDP. 2002. Solomon Islands Human Development Report,

UNEP/WCMC 2001. Cartographer Philippe Rekacewicz, UNEP/GRID-Arendal. http://maps.grida.no/go/graphic/distribution_of_coral_mangrove_and_seagrass_diversity

UNEP-WCMC. 2008. National and Regional Networks of Marine Protected Areas: A Review of Progress. UNEP-WCMC, Cambridge.

Van Helden,F 2005. Lessons Learned in Community Based Conservation in Papua New Guinea. The Nature Conservancy and WWF Papua New Guinea, July 2005

Verducci M., A. Benet, A. Aubanel, C. Monier, M. Tatarata, E. Garganta and B. Salvat. 2007 Les aires marines protégées en Polynésie française. Ier Colloque national sur les Aires Marines Protégées, Boulogne-sur-mer, novembre 2007, Bulletin Société des Etudes Océaniennes.

Vieux C, Aubanel A, Axford J, Chancerelle Y, Fisk D, Holland P, Juncker M, Kirata T, Kronen N, Osenberg C, Pasisi B, Power M, B. S, Shima J, Vavia V. 2004. A century of change in coral reef status in Southeast and Central Pacific: Polynesia Mana

Node, Cook Islands, French Polynesia, Kiribati, Niue, Tokelau, Tonga, Wallis and Futuna. In: Wilkinson (ed) Status of Coral Reefs of the World 2004, Vol 2, p 363-380.

Vunisea, A. 2004. Community based fishery management plans for Tokelau. SPC Fisheries Newsletter #108 – January/March 2004.

Walker, R. H. Perks, F. Hartley, T. Morove, M. Karo, and J. Comley. 2008. Short term recovery of coral reef fish communities under customary management in New Ireland, Papua New Guinea. Poster presented at 11th ICRS, Fort Lauderdale, USA

Ward, R.G. 1998. Land Tenure in the Pacific Islands. In: Resettlement Policy and Practice in Southeast Asia and the Pacific. ADB, Manila.

Watling, D. 2007. Conservation Crusading or Neocolonialism – the Role of International NGOs in the Island Pacific? Invited Plenary Presentation at 'The Biodiversity Extinction Crisis – An Australasian and Pacific Response', Society for Conservation Biology, University of New South Wales, Sydney

Wetlands International et al. No date. Sinub, Tab, Tabad and Laugum Wildlife Management Areas.

Whittingham, E., Campbell, J. and Townsley, P. 2003. Poverty and Reefs: A global overview, DFID–IMM–IOC/UNESCO, 260pp

Wilson, J. 2007. Scale and Costs of Fishery Conservation. International Journal of the Commons. Vol 1, no 1 October 2007, pp. 29-41

Wood, L., Fish L., Laughgren J., Pauly D. 2008. Assessing progress towards global marine protection targets: shortfalls in information and action. Oryx 42, 340–351.

World Bank. 2000a. Voices from the Village: A comparative Study of Coastal Resource Management in the Pacific Islands. Discussion Paper No. 9, Papua New Guinea and Pacific Islands Country Management Unit, East Asia and Pacific Region The World Bank, Washington, D.C.

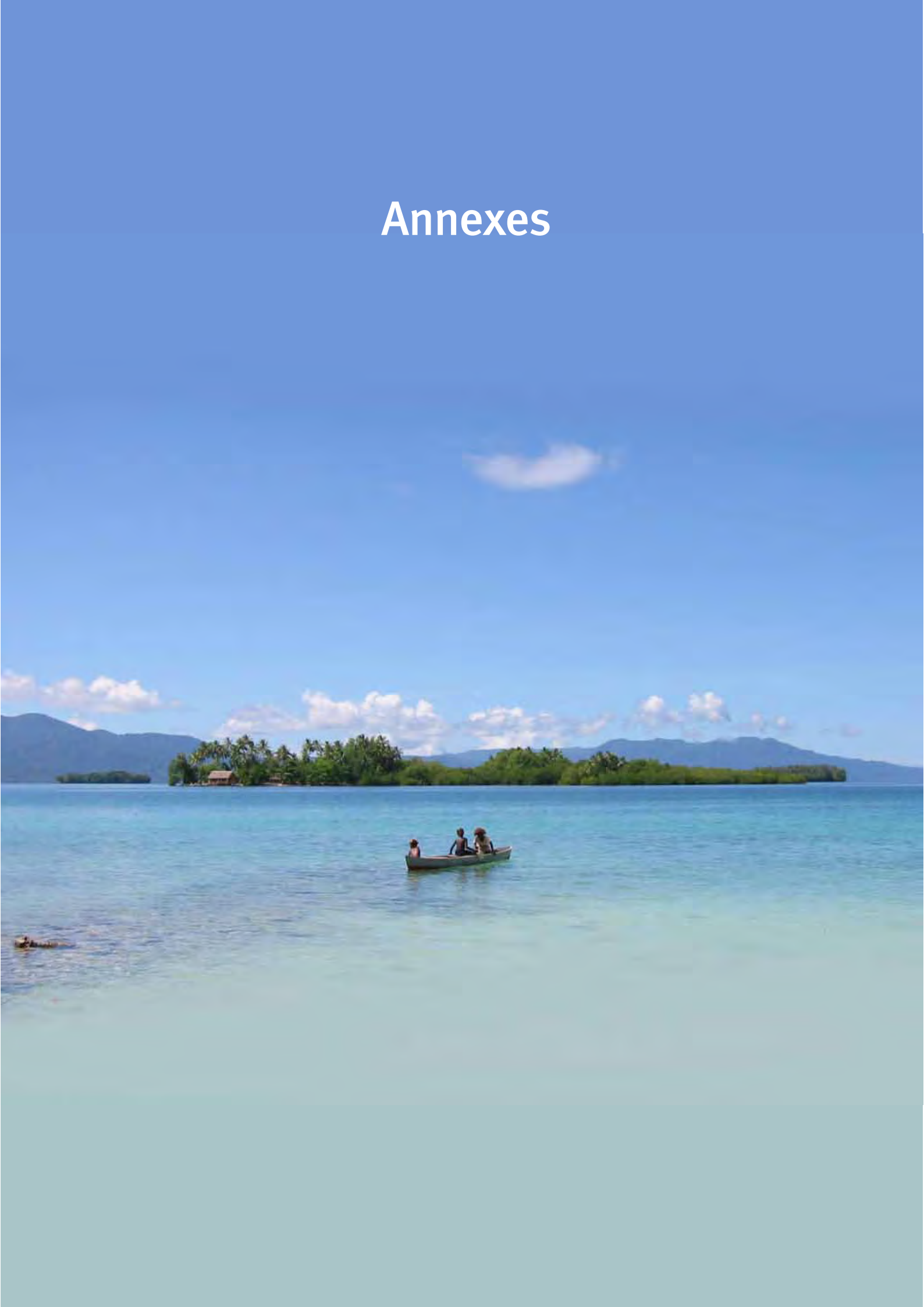
World Bank 2000b. Cities, Seas, and Storms: Managing Change in Pacific Island Economies. Volume 3 – Managing the Use of the Oceans, Papua New Guinea and Pacific Islands Country Unit, The World Bank. http://go.worldbank.org/IGWRDY16T0

World Bank 2006. Scaling Up Marine Management: the Role of Marine Protected Areas. World Bank report # 36635-GLB. Washington, D.C. 100 pp.

Zann, L. P. 1985. Traditional management and conservation of fisheries in Kiribati and Tuvalu atolls. Pages 53-77 in K. Ruddle, and R. E. Johannes, editors. The traditional knowledge and management of coastal systems in Asia and the Pacific. United Nations Environmental and Cultural Organization, Jakarta Pusat, Indonesia.

Zukuli J. and H. Clothier. 2008. Research into the attitudes and perceptions towards natural resource based conflict in local communities. Choiseul, Solomon islands. Live and Learn Environmental Education, Solomon Islands.

Annexes



ANNEX 1 SUMMARY STATUS OF MARINE MANAGED AREAS – INDEPENDENT COUNTRIES

The present study aimed to "provide an up to date inventory of all the available information on the number and size of formally gazetted, non-gazetted MPAs and LMMAs in Melanesia and Polynesia and to provide a rough estimate of the current size in km^2 of gazetted and non-gazetted MPAs in each country and sub-region. Most independent countries did not have official lists of MPAs so the data available in the World Database of Protected Areas which has recently incorporated other major data sources was used as a starting point and was used as an indicator of sites that could be considered "official" or gazetted as the varying and confusing legal regimes across countries did not allow for rigorous distinction between gazetted and non-gazetted sites.

Information on the MMAs of South Pacific countries and territories was compiled thanks to the following contributors: American Samoa; P. Anderson (SPREP) with DMWR. Cook Islands; S. George with, A. Tiraa, National Environment Service, Fisheries Department (MAF). Fiji; FLMMA / IAS, A. Tawake, K. Tabunakawai with, J. Comley. French Polynesia ; J. Petit, M. Verducci, P. Cohen. New Caledonia; C. Chevillon, C. Vieux. Niue; B. Pasisi, D. Fisk and MPAglobal.org. Papua New Guinea; M. Pontio, R. Samuel, J. Kinch, H. Walton, A. Jenkins, H.Perks, P. Lokani, D. Melick, D. Afzal, R.Hamilton and LMMA Annual Report 2007. Samoa; P. Ifopo, T. Tauaefa, P. Anderson (SPREP) with Samoa Government (Fisheries and Environment Departments). Solomon Islands; H. Tafea, D. Notere, A. Schwarz, P. Ramohia, B. Manele, J. Healy, A. Bero, S. Aswani, R. Hamilton. Tokelau; Axford 2007, D. Fisk and Vunisea 2004. Tonga; S. Malimali, P. Cohen. Tuvalu , S. Alefaio. Wallis and Futuna; C. Vieux and, Vieux et al. 2004. Vanuatu; T. Maltali, S. Rena and, Johannes & Hickey 2004, C. Bartlett.

Caveats

A total possible number of sites is given for each country based on WDPA figures plus sites recorded in this study. An estimate of how many of these may "enjoy better protection than the surroundings" reported within the last 3 years was used to determine "active" sites. Individual LMMA and CCA sizes were gathered for significant proportion of sites but for most countries the area coverage is based on less than the total number of sites and therefore represents a minimum figure. New data are becoming available on a regular basis and countries have been encouraged to update national lists during this project so the present inventory represents a snapshot of the data available during 2008.

Sources of statistics:

SPC: Population, Population density, Annual growth rate, Land area, EEZ Area, Territorial waters (Procfish project: Approximate area of internal and territorial waters based on SWBD: Shuttle Radar Topography Mission Water Body[1])

SOPAC: Coast line

Spalding et al. 2001: Reef area

WDPA: information is currently under review and was extracted from the World Database on Protected Areas (WDPA) in January 2008. The WDPA is a joint project of UNEP and IUCN, produced by UNEP World Conservation Monitoring Centre (UNEP-WCMC) and IUCN WCPA. Please contact protectedareas@unep-wcmc.org for more information

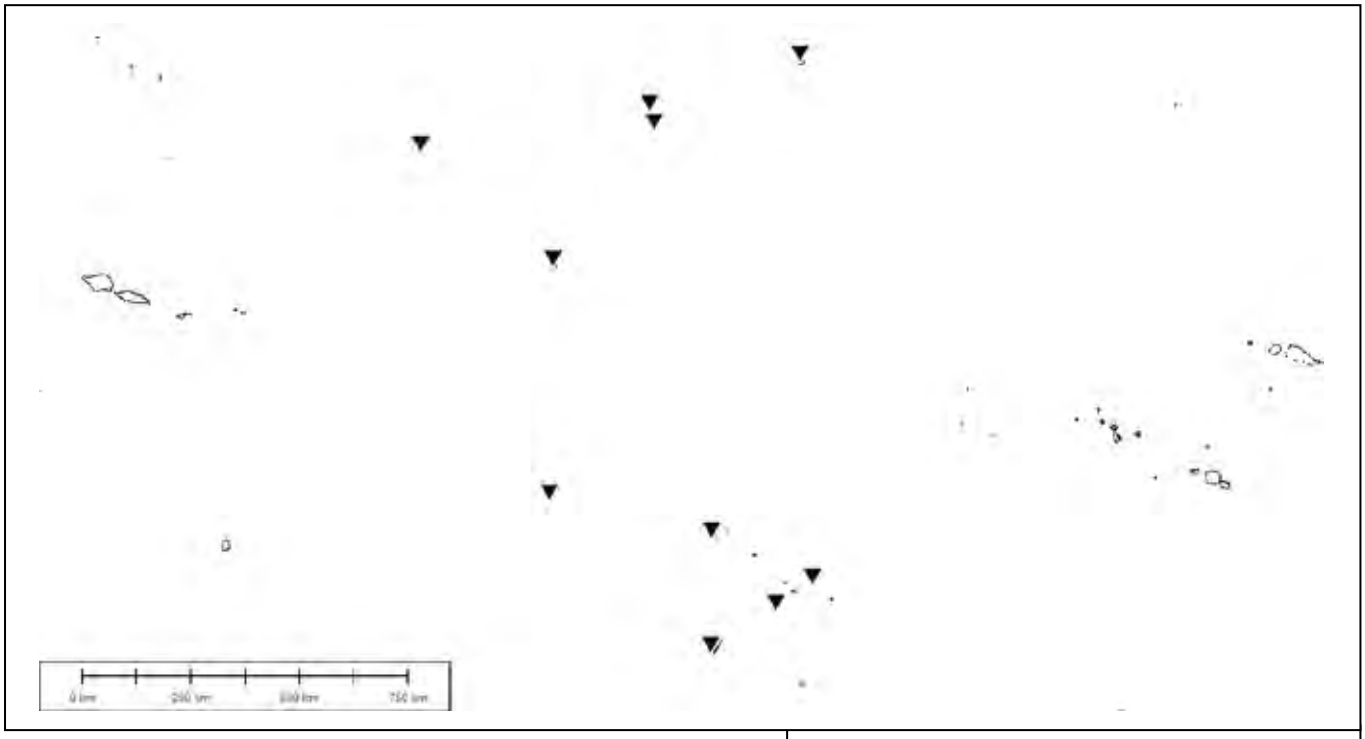
MMA sites and locations: The sources and collaborators are acknowledged on each country page.

MMA area coverage: Area of MMAs is based primarily on information published or provided by sites or sponsoring organizations. Where this is lacking the information from WDPA was used although wherever possible boundaries were delineated using GIS software (P. Anderson for Samoa and IAS/FLMMA for Fiji). For Solomon Islands, Vanuatu, Cook Islands, PNG and Tuvalu area estimates were derived using GoogleEarth (earth.google.com) to trace sketch maps or estimated boundaries based on the available satellite imagery. Areas were calculated using GEpath 1.4.3 (http://www.sgrillo.net/googleearth/gepath.htm).

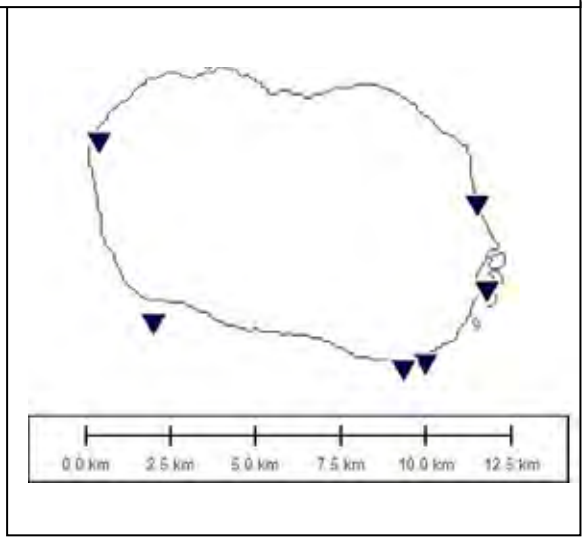
1 http://www.spc.int/coastfish/sections/reef/PROCFish_Web/Modules/GIS/GISCountryChoice.aspx

COOK ISLANDS

Status of Marine Managed Areas



Map showing location of Marine Managed Areas in Cook Islands, (Rarotonga shown in inset right).



Cook Islands basic data

Population (2007 est.)*	13,500
Population density (/ km^2)*	83
Annual growth rate (%)*	-1.52
Land area (km^2)*	237
Coast line (km)**	120
EEZ Area (km^2)*	1,830,000
Territorial waters***	31,314
Reef area (km^2)****	220

Records exist for some 39 Marine Managed Areas (MMAs) in Cook Islands but 24 are currently reported to be "active" of which 13 are listed in the World Database of Protected Areas. Apart from the Suwarrow National Park, the Tikioki Marine Reserve and the Takutea Wildlife Sanctuary, most (21) MMAs are traditional closures known as *ra'ui*. All MMAs have a strong role for communities and can be considered Community Conserved Areas except for Suwarrow National Park which is Crown Land.

Ra'ui may be total bans on access to an area or bans on particular resources and are usually but not always periodic or temporary. While these continue to be used in much the same way in the outer islands the use of Ra'ui in Rarotonga declined in the 1970's. The late 1990's saw a revival of the *ra'ui* system promoted by the Koutou Nui. The numbers have now reduced slightly and consolidated at 5 *ra'ui* and a marine reserve around Rarotonga covering 2.1 km^2 or around 15% of the reef and lagoon area.

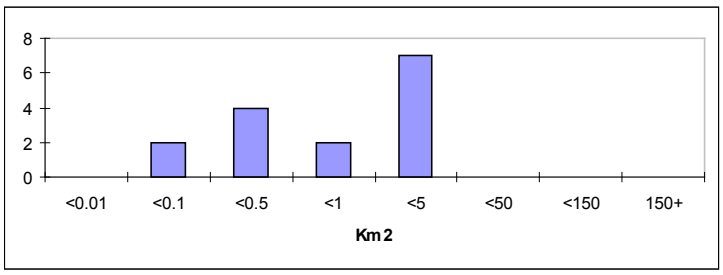
Data are not available for half the outer island *ra'ui* but the 9 for which area estimates exist contribute some 16.1 km^2 to the country's total of 18.9 km^2 marine managed areas.

Marine Managed Areas	Km^2	n
Marine Managed Areas recorded (active)*		39 *(24)*
Locally managed marine areas (active)		23 *(23)*
Community conserved areas**		23
No-take Zones (*ra'ui)***		24 *(21)*
MMA coverage, all records****	18.9	15
LMMA coverage	18.1	14
Area of No-take Zones inc *ra'ui*	18.9	15
Average NTZ	1.3	15
Median NTZ	0.9	15
Max NTZ area	4.1	15
Min NTZ area	0.04	15

*Protected areas with marine component, all sources **IUCN definition ***Ra'ui are often periodic or seasonal ****Does not include the reportedly inactive Manuae Lagoon Trochus Sanctuary

The MMAs on Rarotonga are all less than 1 km^2 in size while outer island ra'ui are usually larger.

Figure. Size distribution of 15 MMAs in Cook Islands



FIJI

Status of Marine Managed Areas

Map showing location of 217 Marine Managed Areas (shaded) and No-take zone or tabu locations (bold) in Fiji (source: FLMMA)

Fiji Islands basic data

Population (2007 est.)*	831,600
Population density (/ km^2)*	46
Annual growth rate (%)*	0.55
Land area (km^2)*	18,272
Coast line (km)**	4,637
EEZ Area (km^2)*	1,290,000
Territorial waters***	114,464
Reef area (km^2)****	10,020

The Fiji Locally Managed Marine Area network (FLMMA) has documented 217 Marine Managed Areas (MMAs) in Fiji containing 222 no-take zones or *tabus*. The World Database of Protected Areas (WDPA) lists 45 protected areas with a marine component of which at least 16 are included in the FLMMA inventory, it is

probable that a number of MMAs are present in Fiji that are not documented by FLMMA or WDPA. Thus there are potentially more than 246 MMAs but as the status of sites in the WDPA is not clear and data is lacking for the majority, the FLMMA inventory probably provides the best indication of "active" sites at the current time. The 217 FLMMA sites are not legally gazetted (bar 1 – a Marine Reserve) but 171 have management plans and all can be classified as Community Conserved Areas.

The first of the CCAs were established in 1997 and more than half were established since 2004 in a period of exponential growth that may currently be leveling off. The situation in Fiji is a clear example of the potential of customary marine tenure as a tool for marine resource management as most sites manage their entire traditional fishing grounds (*I qoliqoli*) as well as implementing *tabu* areas within these. Currently 114 of Fiji's 410 *qoliqoli* are under such management equivalent to third of *qoliqoli* area.

Marine Managed Areas	Km^2	n
Marine Managed Areas (active)*		246 *(217?)*
Locally managed marine areas (active)		217 *(217?)*
Community conserved areas**		217
No-take Zones or *tabus****		222
MMA coverage, all records	10,880	190
LMMA coverage	10,816	183
Area of No-take Zones	593	183
Average NTZ	2.60	179
Median NTZ	1.0	179
Max NTZ area	41.2	179
Min NTZ area	0.01	179

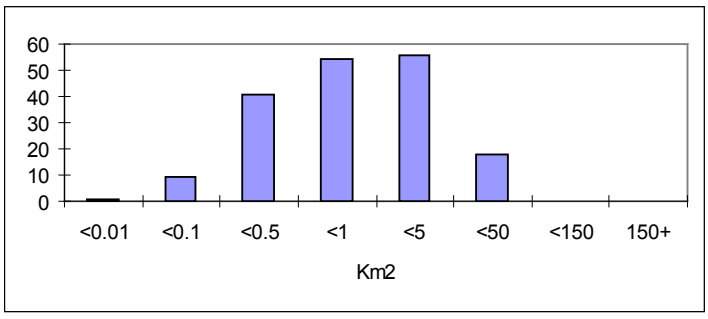
*Protected areas with marine component **IUCN definition

***Some CCAs/ LMMAs contain more than 1 NTZ

The further potential of customary tenure in forming the basis of ecosystem approaches to management by including terrestrial areas is being piloted in some sites.

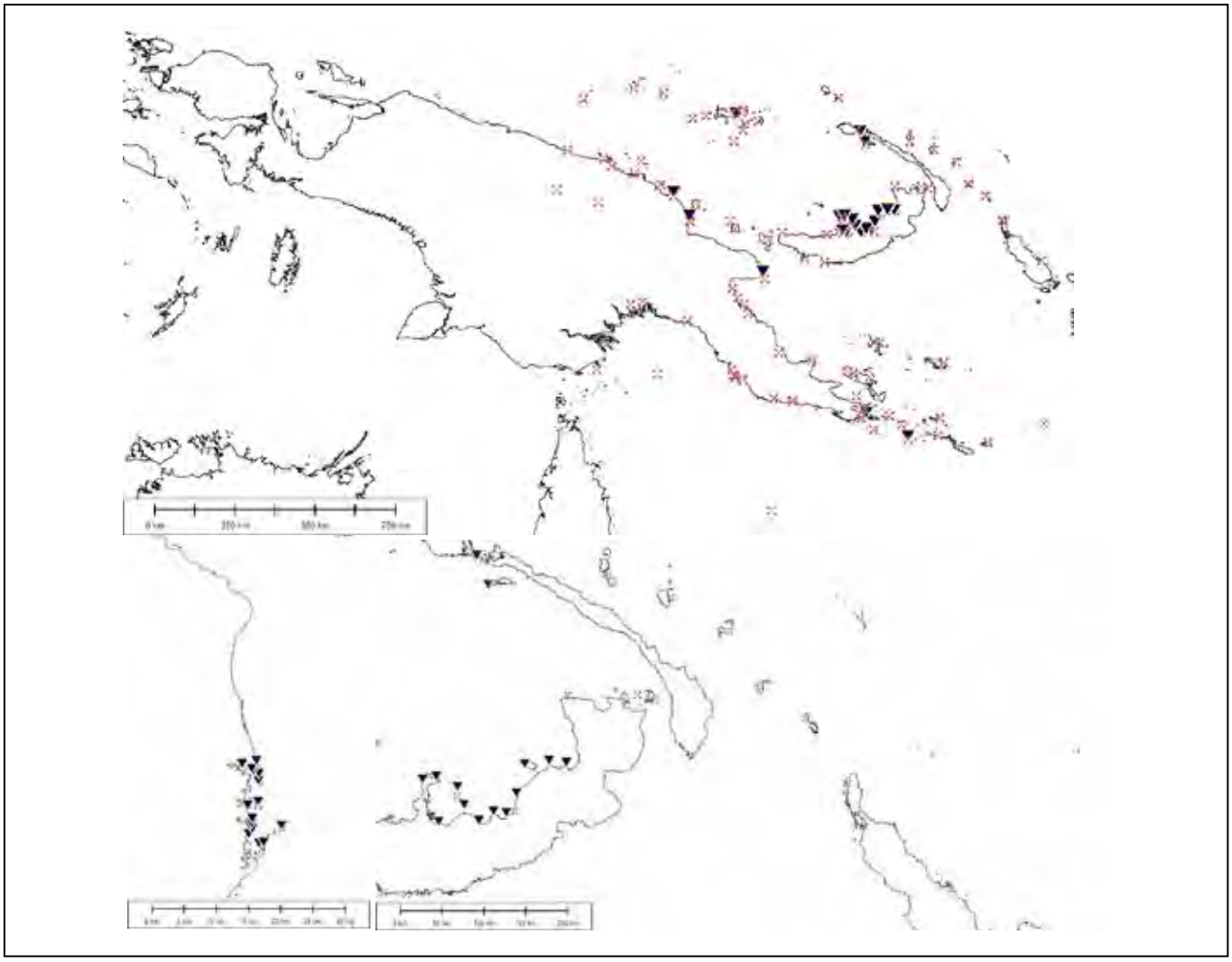
Approximately half the tabus are larger than 1 km^2 and an important feature is that they may be occasionally opened for harvest.

Figure. Size distribution of tabu zones in Fiji (n=179)



PAPUA NEW GUINEA

Status of Marine Managed Areas



Map showing location of Marine Managed Areas in the World Database of Protected Areas (crosses) and Locally MMAs (triangles)

Papua New Guinea basic data

Population (2007 est.)*	6,332,750
Population density (/ km^2)*	14
Annual growth rate (%)*	2.22
Land area (km^2)*	462,840
Coast line (km)**	20,197
EEZ Area (km^2)*	3,120,000
Territorial waters***	355,699
Reef area (km^2)****	13,840

The World Database of Protected Areas lists some 92 protected areas with a marine component in PNG comprising "Marine Parks" or Wildlife Management Areas (WMA) extending over 3,700 km^2. These sites are mostly "proposed" and many are likely to be inactive based on local reports[2]. The current study has documented 86 Community Conserved Areas with a marine component, usually denominated Locally Managed Marine Areas (LMMAs) but also comprising WMAs, Community Fishery Management Areas and Private Arrangements. Only 12 of these 86 records are included in the WDPA list. Although the majority of CCAs appear to have been at least recently active and a number are in various stages of negotiation or proposal. It is difficult to confirm this or indeed obtain reliable geospatial data for more than half. For these reasons the information available for PNG is does not provide an accurate estimate and further work is required.

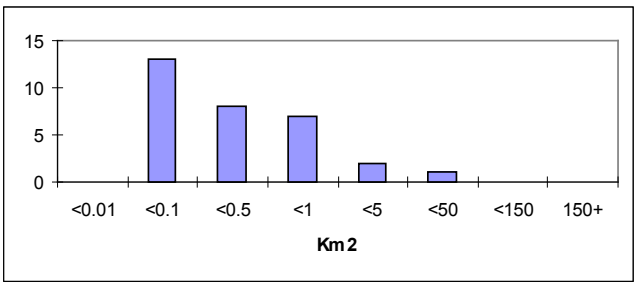
Commonly communities, supported to varying degrees by local or international Non Government Organizations, are designating permanent or periodic *tabu* or no-take zones and, in at least 2 cases, are also preparing management plans of the wider traditional fishing grounds. As many threats to the marine environment originate inland, ecosystem based approaches are increasingly considered. Some sites date back more than 10 years although recently the numbers have swollen with the addition of community fisheries sites, although the project has finished these may still be active.

Marine Managed Areas	Km^2	n
Marine Managed Areas (active)*		166 (80?)
Locally Managed Marine Areas (active)		86 (70?)
Community conserved areas**		79
No-take Zones*** (active)		94 (80?)
MMA coverage, all records ****	3,764	60
LMMA coverage	59.4	23
Area of No-take Zones	17.8	31
Average NTZ	0.55	31
Median NTZ	0.16	31
Max NTZ area	6.5	31
Min NTZ area	0.012	31

*Protected areas with marine component **IUCN definition ***Some LMMAs contain more than 1 NTZ ****figures in brackets are the size of the sample from which these figures were calculated, some sites may not be active.

The data available for the LMMA sites thought to be active suggest more than 59 km^2 of marine area is under management with some 18 km^2 of No-take zones or tabu. One tabu zone is 6.5 km^2 but the majority are under a fifth of km^2.

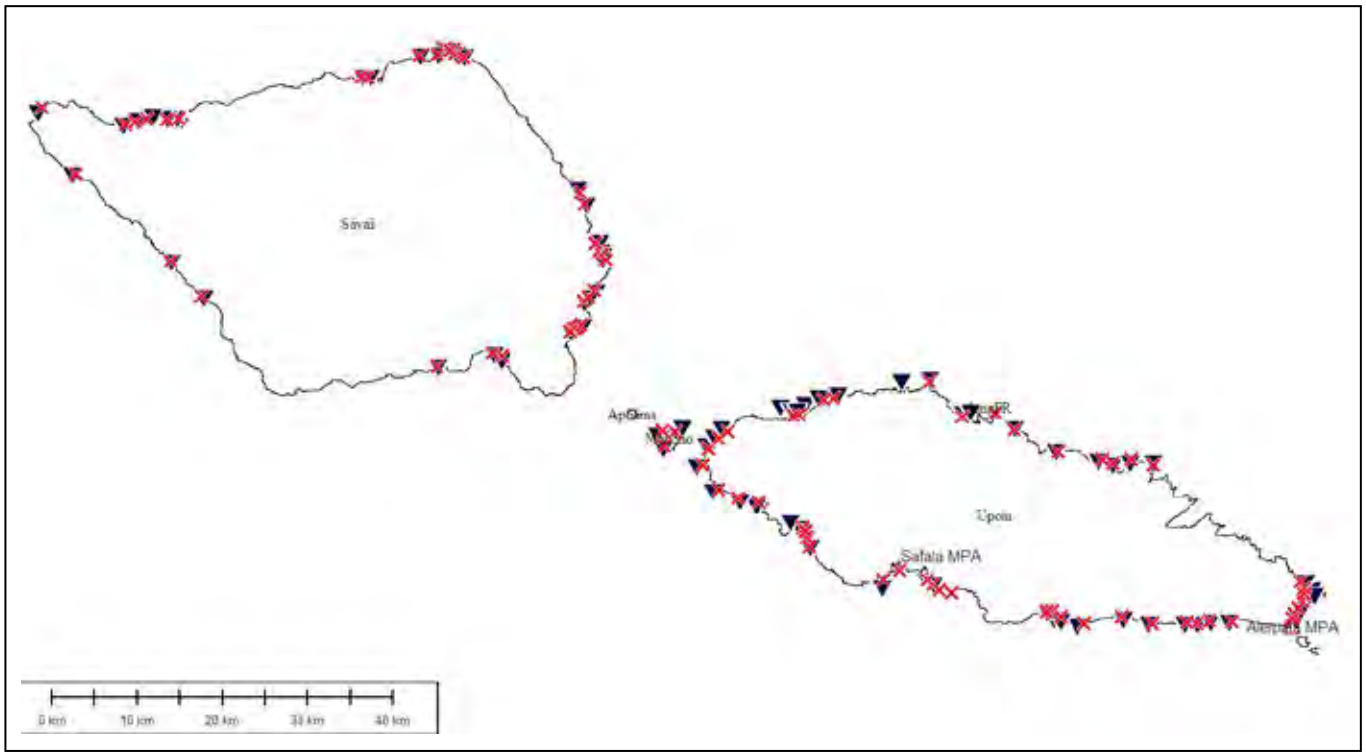
Figure. Size distribution of No takes zones in PNG



2 E.g. Jenkins and Kula 2000, Chatterton et al. in press

SAMOA

Status of Marine Managed Areas



Map showing location of 82 documented Marine Managed Areas (▼) and 78 no-take zones or fish reserves (X) in Samoa

Samoa basic data

Population (2007 est.)*	179,500
Population density (/ km^2)*	61
Annual growth rate (%)*	0.12
Land area (km^2)*	2,935
Coast line (km)**	403
EEZ Area (km^2)*	120,000
Territorial waters***	9,995
Reef area (km^2)****	490

The World Database of Protected Areas lists a total of 8 protected areas with a marine component recognized by the Division of Environment & Conservation (DEC). These include the Aleipata and Safata Marine Protected Areas (ASMPA) established in 2002 and which cover 81.1 km^2 enclosing 20 village no-take zones covering 6.21 km^2. The remaining 6 protected areas are reported to have marine areas of 89.6 km^2 (Tafua and Falealupo Rainforest Reserves and Uafato Conservation Area being the largest). This is likely to be an overestimate and it is not clear if there is active management.

The Fisheries Division (FD) initiated a large scale Village Fisheries Program in the late 1990s which resulted in up to 76 villages developing management plans for their marine areas including no-take zones in many cases. Currently some 51 of these Community-Based Fisheries Management (CBFM) sites are active and ongoing assessment by the FD suggests that the CBFM managed areas cover more than 38.3 km^2 with 50 no-take zones covering 9.4 km^2.

The Palolo Deep Marine Reserve is co-managed but essentially all Samoa's MMAs can be classified as Community Conserved Areas.

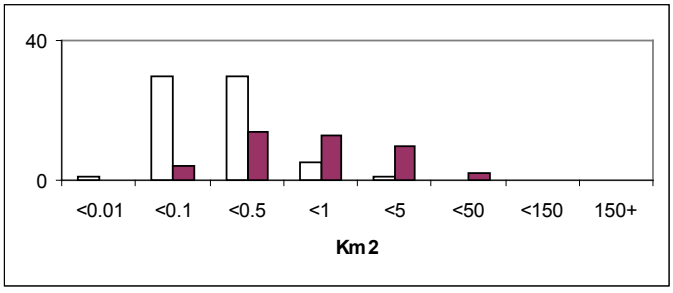
The ASMPA, CBFM sites and marine areas of the terrestrial protected areas comprise a total of 209.1 km^2. Both DEC and FD aim to continue expanding efforts with the addition of several sites per year each and increased collaboration between the agencies.

Marine Managed Areas	Km^2	n
Marine Managed Areas (active)*		84 (54?)
Locally MMAs – village/district (active)		57 / 2 (52?/2)
Community conserved areas**		82
No-take Zones***		82
MMA coverage, all records ****	209.1	59
LMMA coverage	119.5	53
Area of No-take Zones	15.8	71
Average NTZ	0.202	67
Median NTZ	0.140	67
Max NTZ area	1.094	67
Min NTZ area	0.010	67

**Protected areas with marine component **IUCN definition ***Some LMMAs contain more than 1 NTZ ****figures in brackets are the size of the sample from which these figures were estimated, some sites may not be active.*

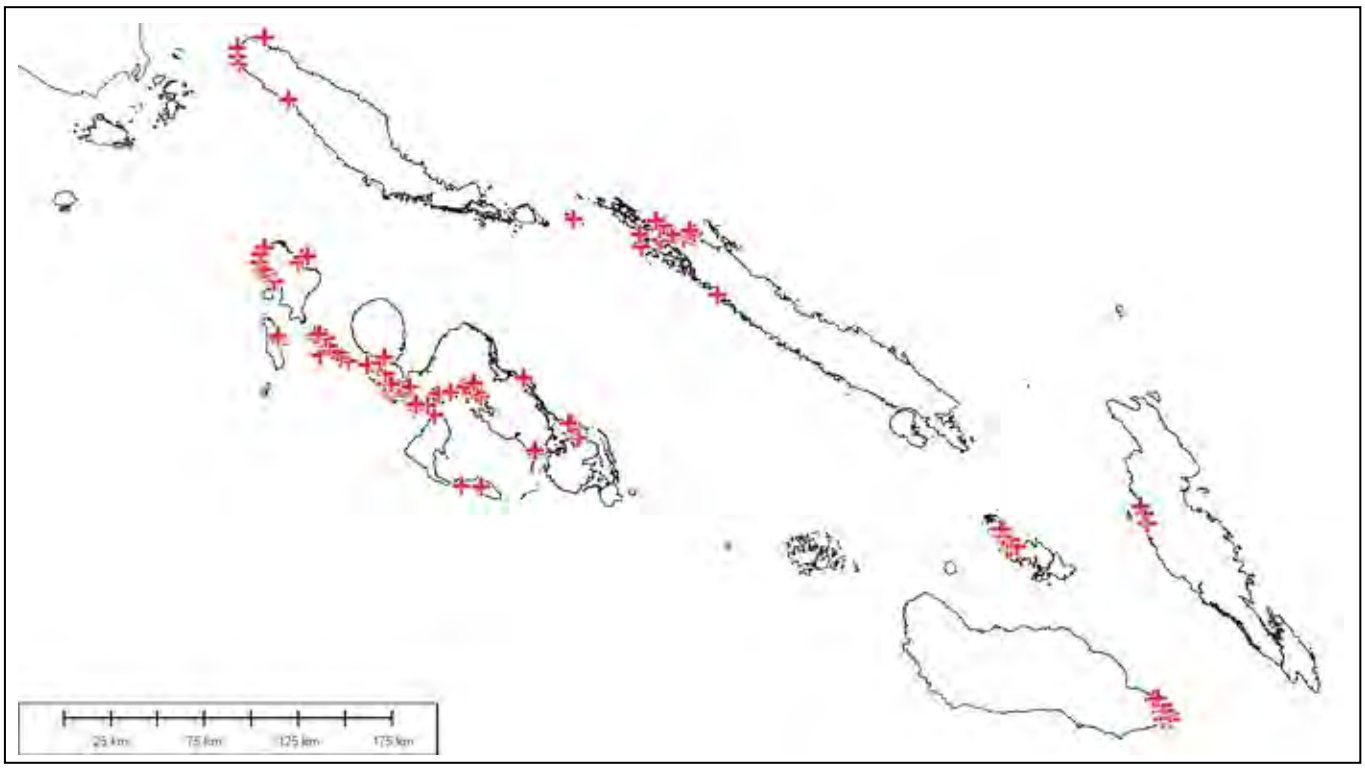
While the exact number of No-take zones is still being determined it appears that the total area is over 16 km^2. All No-take zones are less than 1.1 km^2 in size with the majority being under 0.15 km^2. Some of the fisheries reserves are likely to be opened for occasional harvest.

Figure. Size distribution of MMAs (dark bars) and No-take zones (clear bars) in Samoa based on available data from 43 and 67 sites respectively.



SOLOMON ISLANDS

Status of Marine Managed Areas



Map showing location of 106 of the 127 Marine Managed Areas in Solomon Islands (excluding E. Rennell World Heritage Area)

Solomon Islands basic data

Population (2007 est.)*	503,900
Population density (/ km^2)*	18
Annual growth rate (%)*	2.68
Land area (km^2)*	28,370
Coast line (km)**	9,880
EEZ Area (km^2)*	1,340,000
Territorial waters***	140,038
Reef area (km^2)****	5,750

This study has documented 127 Marine Managed Areas (MMAs) in Solomon Islands of which 22 are listed in the World Database of Protected Areas. 113 MMAs show signs of being "active" of which 109 can be classified as Community Conserved Areas and the remaining 4 are co-managed with strong community involvement. The oldest functioning MMAs date to the mid 1990s and since 2000 the numbers of CCAs appear to be increasing exponentially with major increases over the last 2 years owing to district approaches in Isabel and Western Province.

Arnavons Community Marine Conservation Area is a co-managed area based on an MoU between national, provincial and community stakeholders and accounts for nearly half of the no-take marine area (157.8 km^2). East Rennell World Heritage Area nominally has a marine area of some 440 km^2 (from the coast to 3nm seawards) but there is no information indicating that this area is actively managed.

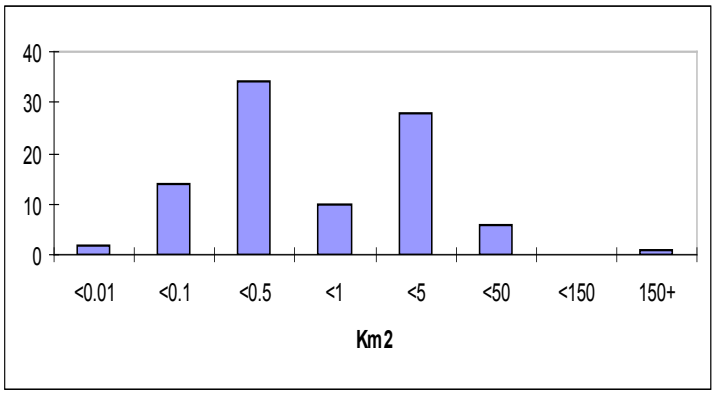
In at least two cases communities are defining management rules for the entire area under their customary marine tenure and designating no-take Marine Protected Areas (MPAs) or tabu zones within this (Kia and Vella Lavella). For the most part though communities are focusing on establishing tabu zones or MPAs and while six of these are large (over 5 km^2) around two thirds are smaller than 1 km^2.

Marine Managed Areas	km^2	n
Marine Managed Areas (active)*		127 (113)
Locally managed marine areas (active)		90 /113 + (112)
Community conserved areas**		109
No-take Zones or tabus***		115
MMA coverage, all records ****	1,380.9	111
LMMA coverage	940.9	110
Area of No-take Zones	310.5	95
Average NTZ	3.3	95
Median NTZ	0.5	95
Max NTZ area	157.8	95
Min NTZ area	0.001	95

*Protected areas with marine component **IUCN definition ***Some CCAs/ LMMAs contain more than 1 NTZ +If the two networks of tabus at Kia and Vella Lavella are not counted as single LMMAs ****potential (includes ERWHA)

An important feature of the CCAs is that 37 of 109 no take zones are periodic or rotational closures. Of the remainder perhaps over 40 are permanent closures and for the rest the status is not clear. It is to be expected that in many cases the community tabus may be opened for harvest occasionally.

Figure. Size distribution of No-take zones in Solomon Is.



TONGA

Status of Marine Managed Areas

Map showing location of Marine Managed Areas in Tonga, recorded in the WDPA (X) and Special Management Areas (triangles)

Tonga basic data

Population (2007 est.)*	102,300
Population density (/ km^2)*	157
Annual growth rate (%)*	0.40
Land area (km^2)*	650
Coast line (km)**	419
EEZ Area (km^2)*	700,000
Territorial waters***	37,526
Reef area (km^2)****	1,500

The World Database of Protected Areas lists 12 protected areas with a marine component in Tonga covering some 9,916 km^2. The Ha'apai Conservation Area comprises 9,879 of these. These MMAs are reported to be neither active nor currently enforced3. In contrast with other Pacific Island countries, customary tenure is not an available tool for coastal resource management but a recent and ongoing Department of Fisheries initiative has resulted in 6 active Special Management Areas for coastal communities and there are plans for more.

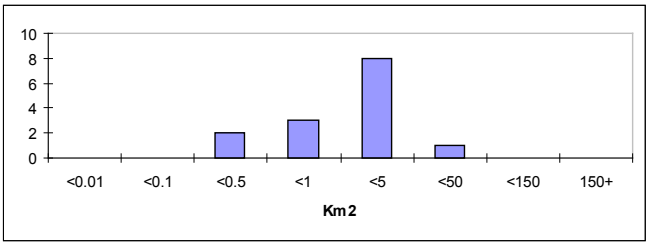
The Special Management Areas extend a total of 92.9 km^2 of which some 10.1 km^2 are permanent no take zones. The No-take zones in the Special Management Areas range from 1-2 km^2.

With the exception of the Fanga'uta and Fanga Kakau Lagoons Reserve at 28.3 km^2 the remainder of the MMAs listed by the WDPA are significantly smaller than 2.5 km^2.

Marine Managed Areas	km^2	n
Marine Managed Areas (active)*		18 (6?)
Locally managed marine areas (active)		6 (6)
Community conserved areas**		-
No-take Zones ***		9
MMA coverage, all records	10,009	18
LMMA coverage	92.9	6
Area of No-take Zones	10.1	9
Average NTZ	1.7	6
Median NTZ	1.5	6
Max NTZ area	2.9	6
Min NTZ area	0.88	6

*Protected areas with marine component **IUCN definition ***3 LMMAs contain 2 NTZ

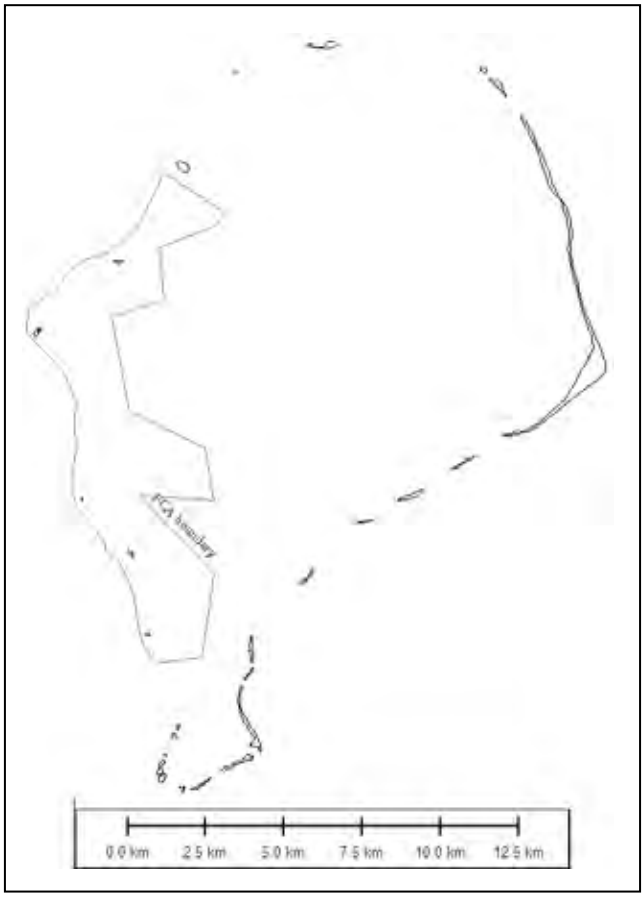
Figure. Size distribution of No-take zones in Tonga (WDPA marine areas reported are included except Ha'apai, n=14)



3 Ausaid 2007

TUVALU

Status of Marine Managed Areas



Map showing location of the Funafuti Conservation Area and boundaries in Funafuti, Tuvalu.

Tuvalu basic data

Population (2007 est.)*	9,700
Population density (/ km^2)*	373
Annual growth rate (%)*	0.29
Land area (km^2)*	26
Coast line (km)**	24
EEZ Area (km^2)*	900,000
Territorial waters***	18,975
Reef area (km^2)****	710

The World Database of Protected Areas lists one designated Marine Managed Area in Tuvalu, this is the Funafuti Conservation Area (FCA) with an area of 35.95 km^2. The FCA was established in 1996 and while it was promoted and supported by external agencies can be considered a Community Conserved Area (CCAs).

Non-government and international agencies have been working with national government in support of CCAs and this has resulted in the recent declaration by communities of CCAs in three islands. The remaining five islands in Tuvalu report the existence of marine CCAs bringing the total of MMAs to 10 and 1 inland lagoon CCA.

The total marine area under management is 75.6 km^2 of which 3 no-take zones make up 50.2 km^2, the largest of which is the FCA.

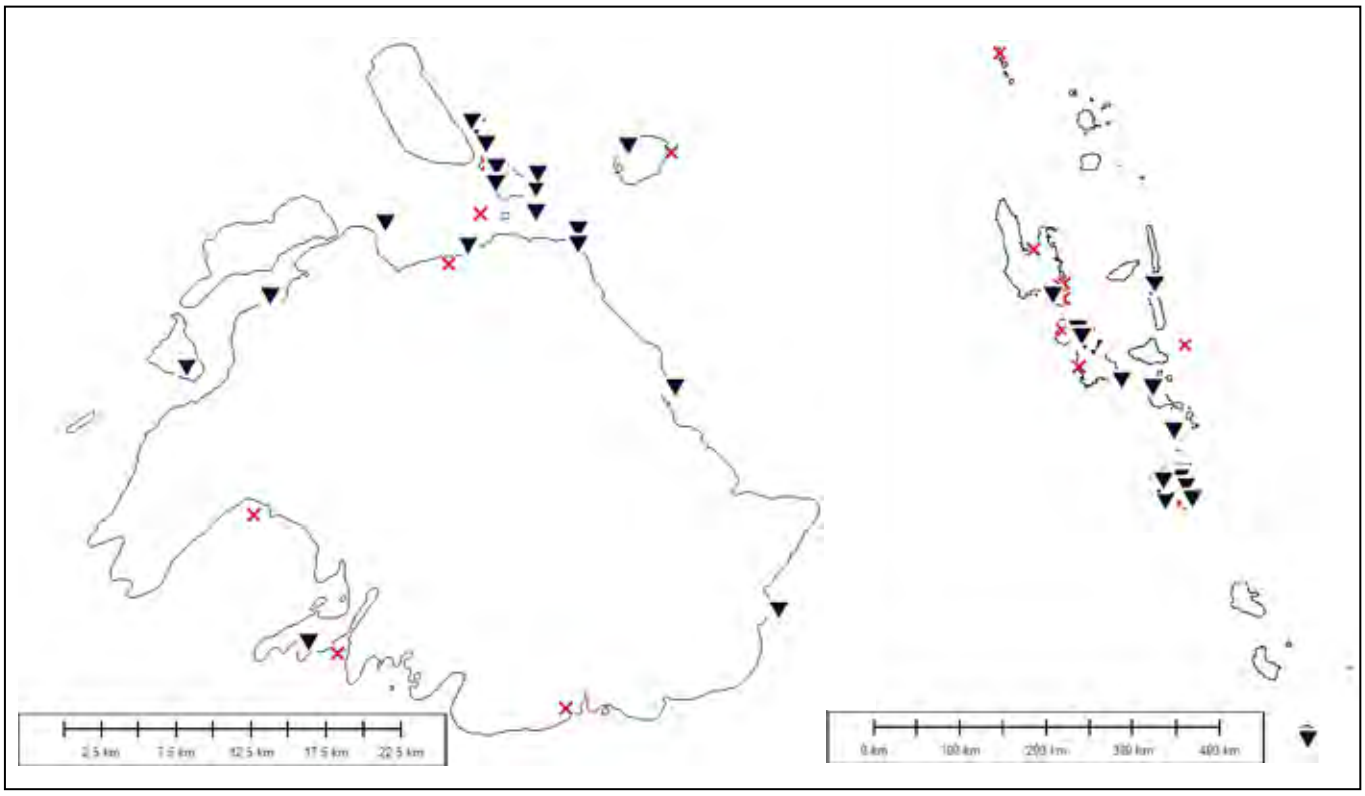
In some cases communities are defining management rules for the entire area under their customary marine tenure. For the most part communities are focusing on management rules within specific areas and in some cases for particular species. All MMAs including the FCA may occasionally be opened to harvesting for important events.

Marine Managed Areas	Km^2	n
Marine Managed Areas (active)*		10 (4+?)
Locally managed marine areas (active)		10 (4+?)
Community conserved areas** (active)		10 (4+?)
No-take Zones***		3
MMA coverage, all records	75.6	10
LMMA coverage	75.6	10
Area of No-take Zones	50.2	3
Average NTZ	16.74	3
Median NTZ	11.75	3
Average MMA	7.56	10
Median MMA	1.99	10

*Protected areas with marine component **IUCN definition ***most CCA allow some restricted harvesting

VANUATU

Status of Marine Managed Areas



Map showing location of Marine Managed Areas in the World Database of Protected Areas (crosses) and LMMAs/CCAs (triangles)

Vanuatu basic data

Population (2007 est.)*	227,150
Population density (/ km^2)*	19
Annual growth rate (%)*	2.56
Land area (km^2)*	12,190
Coast line (km)**	2,528
EEZ Area (km^2)*	680,000
Territorial waters***	69,169
Reef area (km^2)****	4,110

The World Database of Protected Areas lists 26 protected areas with a marine component in Vanuatu. The President Coolidge and Million Dollar Reef Marine Reserve (2.15 km2) is perhaps the best know MMA but the traditional practice of closing reef areas under a ban or tabu is thought to still be widespread although largely unrecorded. Available records4 of these Community Conserved Areas (CCAs) as well as initiatives

4 Johannes and Hickey 2004

pioneered by Fisheries and Environment Departments and local NGOs suggest at least 44 CCAs with a marine component are documented or reported of which 15 are included in the WDPA list (1 entry comprises a network of 10 CCAs).

The Vatthe Conservation Area, Paunagisu MPA, Mystery Island MPA and Nguna_Pele MPA network (NPMPA) probably represent the largest marine CCAs based on the limited information available. Information is lacking for a majority of sites in the WDPA list as well.

Area estimates available for 22 sites suggest that there is at least 89.4 km2 of marine area managed most of which is attributable to CCAs. Although CCAs are thought to be relatively small the average and median sizes of the 22 sites are between 2-2.8 km2 although the NPMPA comprises a network of smaller sites.

A register of Protected Areas and Community Conserved Areas is reportedly maintained by the Environment Department but is not currently available and concerted efforts at documenting MMA coverage are urgently needed.

Marine Managed Areas	Km^2	n
Marine Managed Areas (active)*		55 (20+)
Locally managed marine areas (active)		44+ (??)
Community conserved areas**		44 (19+)
No-take Zones or tabus***		44
MMA coverage, all records ****	89.4	(22)
LMMA coverage	58.1	(19)
Area of No-take Zones	89.4	(22)
Average NTZ		
Median NTZ		
Max NTZ area		
Min NTZ area		

*Protected areas with marine component **IUCN definition ***Some CCAs/ LMMAs contain more than 1 NTZ

ANNEX 2 SUMMARY STATUS OF MARINE MANAGED AREAS – TERRITORIES AND ASSOCIATED STATES

AMERICAN SAMOA

Status of Marine Managed Areas

American Samoa basic data

Population (2007 est.)*	65,000
Population density (/ km^2)*	325
Annual growth rate (%)*	1.67
Land area (km^2)*	200
Coast line (km)**	116
EEZ Area (km^2)*	390,000
Territorial waters (km^2)***	9,910
Reef area (km^2)****	220
MMA area	173.5
LMMA coverage	2.6
NTZ area	158.8

*SPC statistics **SOPAC data ***SPC PROCFish project.**** Spalding et al. 2001

Nineteen protected areas in American Samoa cover more than 173.5 km2 of marine area. The Rose Atoll National Wildlife Refuge alone accounts for 158.8 km2 of these and the National Park of American Samoa accounts for a further 10 km2. The remaining sites range from 0.05 to 0.71 km2 in size and comprise 10 community-based fisheries management program (CFMP) reserves, 3 special management areas (SMAs), 2 National Natural Landmarks, a territorial marine park and the Fagatele Bay National Marine Sanctuary. The average size of MMA is 11.6 km2 and the median 0.4 km^2.

The only permanent no-take area is Rose Atoll, a remote atoll. The National Park of American Samoa contracts with land owners, who agree to certain restrictions in return for monetary support; subsistence fishing, however, is allowed throughout the park areas and enforcement is lacking. The Fagatele Bay National Marine Sanctuary (FBNMS) is reviewing the management plan in collaboration with the Sanctuary's Advisory Council, local government partners and villagers to enhance and strengthen future management.

The Department of Marine & Wildlife Resources (DMWR) has an on-going Community-Based Fisheries Management Program (CFMP) in 10 participating village MPAs, each with its own management plan. All of the CFMP reserve sites were established and managed principally to support the continued sustainable extraction of renewable living resources within or outside the MPA by protecting biologically important

habitat or providing harvest refugia. These MPAs also restrict activities that may adversely impact ecological or cultural services. Each of the sites prohibits resource extraction with the exception of subsistence fishing for cultural practices in specific instances. At times certain areas of the reef will be opened for use by elders in the village through the permission of the village council and as outlined in the individual MPA's management plan. Closure of the sites expires after three years, at which time the village reviews the management plan and its effects and decides if they would like to continue it with the same regulations, alter the regulations or discontinue the program. Some villages elect to open the sites temporarily for fishing before closing them for an extended period. DMWR is moving toward discussions of more long-term or permanent closures for community sites and a compendium of village by-laws regulating the use of a village marine protected area has been drafted under DMWR code to improve enforcement. DMWR is also developing a network of no-take MPAs with a target to include 20% of the territory's coral reef ecosystems by 2010[5].

5 Goldberg et al. 2008, Fenner et al . 2007, Gombos et al. 2007.

FRENCH POLYNESIA

Status of Marine Managed Areas

French Polynesia basic data

Population (2007 est.)*	261,400
Population density (/ km^2)*	74
Annual growth rate (%)*	1.30
Land area (km^2)*	3,521
Coast line (km)**	2,525
EEZ Area (km^2)*	5,030,000
Territorial waters (km^2)***	243,885
Reef area (km^2)****	6000
MMA area	2,837
CCA/LMMA coverage*****	441
NTZ area	1,282

*SPC statistics **SOPAC data ***SPC PROCFish project.**** Spalding et al. 2001 **** Rahui and PGEM sites

Reports on the quantity and size of MMAs in the French Pacific Overseas Territories vary. Gabrie et al. (2007) report 3 MPAs and 1 MMA with 8 no-take zones for French Polynesia. The WDPA as of June 2008 reported 9 protected areas with a marine component in French Polynesia.The results obtained in the current study are at variance with these figures.

French Polynesia reports 6 MPAs (174.25 km^2) as well as the Fakarava Biosphere reserve (2,564 km^2 marine area) comprising 7 atolls each with one or more marine closed areas (1,098 km^2 total), a Marine Zone Management Plan (PGEM) in Moorea with 8 closed areas (9.38 km^2) and an additional two reported traditional closures or rahui (50 km^2 total). There are at least five rahui or traditional closures (rotational) integrated into the Fakarava Biosphere reserve in addition to the above two documented rahui which together total some 430 km^2, most of which are rotational and may be species specific. The PGEM and Biosphere Reserve incorporate wide degrees of community participation through co-management arrangements6. It is likely that other rahui exist and various initiatives have raised the possibility of their revival.

6 Verducci et al 2007, Julie Petit pers.comm., Gabrie et al. 2007, Benet 2005.

NEW CALEDONIA

Status of Marine Managed Areas

New Caledonia basic data

Population (2007 est.)*	241,700
Population density (/ km^2)*	13
Annual growth rate (%)*	1.56
Land area (km^2)*	18,576
Coast line (km)**	2,254
EEZ Area (km^2)*	1,740,000
Territorial waters (km^2)***	68,665
Reef area (km^2)****	5,980
MMA area	16,188
NTZ area	445

*SPC statistics **SOPAC data ***SPC PROCFish project.**** Spalding et al. 2001

Reports on the quantity and size of MMAs in the French Pacific Overseas Territories vary. Gabrie et al. (2007) report 18 MPAs for New Caledonia. The WDPA as of June 2008 reported 30 protected areas with a marine component for New Caledonia. The results obtained in the current study are at variance with these figures.

New Caledonia reported a total of 20 MMAs as of July 2008 covering 444.5 km^2. The "Lagoons of New Caledonia: Reef Diversity and Associated Ecosystems" was declared a World Heritage site on 1st of January 2008 comprising 28,614 km^2 and consisting of six major lagoonal areas with a core marine area of 15,743 km^2. The MMAs are managed in a centralized manner but there are participatory management committees in two areas7.

7 Christophe Chevillon, Pers. Comm. to C. Vieux, http://www.ecologie.gouv.fr/-La-Nouvelle-Caledonie-.html, http://whc.unesco.org/en/list/1115/

NIUE

Status of Marine Managed Areas

Niue basic data

Population (2007 est.)*	1,600
Population density (/ km^2)*	6
Annual growth rate (%)*	-2.40
Land area (km^2)*	259
Coast line (km)**	64
EEZ Area (km^2)*	390,000
Territorial waters (km^2)***	2,983
Reef area (km^2)****	170
MMA area	30.6
LMMA coverage	0.46
NTZ area	0.46

*SPC statistics **SOPAC data ***SPC PROCFish project.**** Spalding et al. 2001

The WDPA lists 3 MMAs in Niue covering a total of 30.5 km^2 of which 30.15 is the marine component of the Huvalu Forest Conservation Area and is a subsistence use area. Under the SPREP International Waters Programmes the two villages of Makefu and Alofi North set up four temporary closed areas and villagers decided that closed areas will rotate as fishing stocks revive8. Fish levels were to be monitored to see whether closed areas are increasing stocking levels9. These closures are reported to survive in the form of a joint MPA and a no-take zone10.

8 Fisk 2007b

9 Fox et al. 2007

10 Brendon Pasisi, Logo Seumanu, pers. comms. 2009

TOKELAU

Status of Marine Managed Areas

Tokelau basic data

Population (2007 est.)*	1,200
Population density (/ km^2)*	100
Annual growth rate (%)*	0.02
Land area (km^2)*	12
Coast line (km)**	101
EEZ Area (km^2)*	290,000
Territorial waters (km^2)***	6,999
Reef area (km^2)****	<50
MMA area	0.5 – 1.76
LMMA coverage	0.5 – 1.76
NTZ area	?

*SPC statistics **SOPAC data ***SPC PROCFish project.**** Spalding et al. 2001

The WDPA lists 3 MMAs in Tokelau but area estimates are provided for only one, Fakaofo Conservation Area at 0.5 km^2 of marine area. No recent information has been obtained for the status of protected areas in Niue although the SPC was providing support for Community Fishery Management Plans in 200411. Work carried out by SPREP in 200412 suggested that there were 2 conservation areas in Atafu Atoll covering 0.7 km^2, Fakaofu Atoll had Fenua Loa CA which is the one recorded at 0.5 km^2 in the WDPA and another measuring 0.25 km^2 , and there were a further two conservation areas in Nukunonu Atoll coming to 0.31 km^2. If these areas are still active then the total area of LMMA for Tokelau would be 1.76 km^2.

11 Vunisea 2004

12 D. Fisk. Pers. Comm. 2009

WALLIS AND FUTUNA

Status of Marine Managed Areas

Wallis and Futuna basic data

Population (2007 est.)*	15,400
Population density (/ km^2)*	108
Annual growth rate (%)*	0.68
Land area (km^2)*	142
Coast line (km)**	129
EEZ Area (km^2)*	300,000
Territorial waters (km^2)***	5,686
Reef area (km^2)****	940
MMA area	-
NTZ area	-

*SPC statistics **SOPAC data ***SPC PROCFish project.**** Spalding et al. 2001

Reports on the quantity and size of MMAs in the French Pacific Overseas Territories vary. Gabrie et al. (2007) report 3 MPAs in Wallis and Futuna. The results obtained in the current study are at variance with these figures.

In Wallis and Futuna, the traditional chiefs are reported to have approached the environment administrators in 1999 requesting the creation of MPAs. Two to three areas were chosen but there has been no monitoring and apparently these MMAs are not functional13.

13 Vieux et al. 2004, C. Vieux Pers. Comm.

ANNEX 3 SURVEY OF LEGAL MEASURES RELATED TO COMMUNITY CONSERVED AREAS IN PACIFIC ISLAND INDEPENDENT STATES [1]

TONGA

Erika J. Techera

Recognition of Indigenous and Community Conserved Areas (ICCAs) in national law or policy or as part of the PA network system

ICCAs are not specifically recognised in national legislation.

The *Parks and Reserves Act 1976* established the Parks and Reserves Authority (under s.3) which has the power to declare or cancel terrestrial and marine protected areas in Tonga (under s.4(1)). Such parks or reserves are then registered under s.4(3). In particular 'parks' are administered for the benefit and enjoyment of all people (under s.7), but 'reserves' are administered for the protection, preservation and maintenance of a valuable feature which allows for greater conditions of entry (under s.8). 'Marine reserves' are administered 'for the protection, preservation and control of any aquatic form of life and any organic or inorganic matter therein' (under s.9). However, this Act does not specifically mention ICCAs. Protected areas can also be declared under the *Birds and Fish Preservation Act 1988* and the *Forests Act*, but no reference is made in those Acts to community-based conservation.

Other general policies/laws that recognize indigenous/community territories or rights to areas or natural resources

Constitution of Tonga

Under the Constitution all land vests in the King and he may grant hereditary estates to nobles and titular chiefs. However, these lands cannot be sold and are subject to allotment. Every male child over the age of 16 years is entitled to two allotments of land which can be allowed out of these hereditary estates or Crown land (see also the *Land Act*).

Fisheries Management Act 2002

The Act provides for conservation, management and sustainable utilisation of fishery resources. Under the Act the Minister may declare any area of fisheries waters and subjacent land to be a *Special Management Area*

1 Prepared by the cited authors as part of IUCN WCPA/CEESP 2008. A survey of legal and policy measures related to Indigenous and Community Conserved Areas (ICCAs) in 21 countries. Strategic Direction on Governance, Communities, Equity, and Livelihoods in Relation to Protected Areas (TILCEPA).

(SMA). The Minister may then designate any local community in Tonga to be a 'coastal community' for the purposes of community based fisheries management. Thereafter the Minister may allocate to the coastal community the responsibility for management of any *Special Management Area* and prescribe the rights and responsibilities of the coastal community in respect of that Area. The coastal community is then responsible for organising itself in a manner that is conducive to the effective conservation and management of fisheries resources in the SMA. Whilst s.15 provides that the Minister must consult with the local community prior to the making of regulations for the SMA and issuing licences for fishing in the SMA. The Act also provides for consultation with coastal communities, in the preparation and review of each fishery plan.

Strengths

The regime provides a clear legislative mechanism for devolution of power to manage SMAs to local custodians.

Weaknesses

The Fisheries Management Advisory Committee constituted under s.8 has a minimum of eight members of which only one represents coastal communities. Furthermore, the mechanism by which a coastal community is designated is unclear. Also the Act does not ensure that coastal community views will prevail in terms of either the making of regulations or granting of fishing permits, only that they must be 'consulted'. It is still the centralised authorities that can override community considerations in these areas.

Aquaculture Management Act 2003

Whilst the Minister retains responsibility for the control, management and development of aquaculture (whether on land or in any aquatic area), this responsibility may be designated to a local community or any coastal community (as established under the *Fisheries Management Act 2002*).

Overall Comments

It appears that community based conservation projects are operating in Tonga (for example the giant clam sanctuaries and fisheries Special Management Areas). However, neither custom nor customary law are mentioned in the Constitution. Nor is customary marine tenure exercised in Tonga and access to fishery resources is open. Therefore, the legal status of these areas is uncertain. The above provisions, which provide for community management, are within fisheries legislation rather than the broader protected area management law. As Tonga has enacted such legislation, the inclusion of ICCAs within the *Parks and Reserves Act* may be appropriate.

The *Environmental Impact Assessment Act 2003* includes a broad power to the Minister to assess any major project for effects upon *inter alia*, ecosystems, endangered flora or fauna, areas of cultural or scientific value, land, water, fishing grounds, physical or cultural resources and the social and the economic well-being of communities. How this Act interlinks with the above legislation is unclear.

Further references

CBD Thematic Report on Protected Areas accessible at http://www.cbd.int/doc/world/to/to-nr-pa-en.doc

Lovell, E R, Palaki, A, *National coral reef status report Tonga* http://www.sprep.org/att/IRC/eCOPIES/Countries/Tonga/5.pdf

Powell, G, *Analysis of environment-related legislation in Tonga*. Samoa : SPREP, 2006. Accessible at http://www.sprep.org/att/publication/000534_IWP_PTR32.pdf

FIJI

Shauna Troniak, with input from Erika Techera and Hugh Govan

Recognition of Indigenous and Community Conserved Areas (ICCAs) in national law or policy or as part of the PA network system

CCAs are not expressly featured in national law. However, provisions in several statutes on forestry, fisheries and natural resources do recognize the right of local communities to control the use of natural resources to varying degrees.

Fiji does not have dedicated legislation dealing with protected areas. Current protected areas established under assorted statutes vary in terms of size and conservation potential and cannot be said to form a representative protected areas system.

Other general policies/laws that recognize indigenous/community territories or rights to areas or natural resources

Constitution (Amendment) Act, 1997

The Constitution does not offer a blanket recognition of customary law; instead, the *Constitution (Amendment) Act 1997* recognizes customary law and traditional rights to terrestrial land, provided they are not inconsistent with any law or governing principle of the state. Article 6(b) preserves ownership of Fijian land according to Fijian custom. Section 38 guarantees that the law applies to every person equally, however it also exempts certain laws and administrative actions regarding customary land, and fishing rights from the equality provision. Section 186 of the *Constitution* makes provision for the application of customary laws and for dispute resolution in accordance with Fijian tradition, but this will depend statute law (ie. customary laws do not apply automatically and must be expressly recognized in a piece of national legislation in order to be recognized by the government).

Native Lands Act, 1978, and Native Land Trust Act, 1985

Under the customary system of land tenure, terrestrial lands and coastal marine areas are the exclusive property of the community. Terrestrial lands were traditionally held by the *vanua* (district) until 1880, when the Great Council of Chiefs (GCC) resolved that native lands should be owned communally by the *mataqali* (clan). This is different to the ownership system in place for coastal marine areas, which are the property of the *yavusa* (tribe), or in some cases the *vanua*. The Native Lands Act was first enacted in 1880 and, following the resolution of the GCC, duly vested customary lands with the *mataqali*. The *Native Land Trust Act*, provides the legal framework for administering native lands in Fiji.

Under the customary system of land tenure, terrestrial lands and coastal marine areas are the exclusive property of the community. Terrestrial lands were traditionally held by the *vanua* (district) until 1880, when the Great Council of Chiefs (GCC) resolved that native lands should be owned communally by the *mataqali* (clan). This is different to the ownership system in place for coastal marine areas, which are the property of the *yavusa* (tribe), or in some cases the *vanua*.

The *Native Lands Act* implements Article 6 of the Constituion. It states that "*[n]ative lands shall be held by native Fijians according to native custom as evidenced by usage and tradition*" and provides for the registration of land. A *Native Land Commission* determines the rightful owner of land if there is a dispute. The *Native Land Trust Act* (NLTA) provides that native lands cannot be alienated even by customary owners, and it vests administrative control of native land in the *Native Land Trust Board* (NLTB). So although the Indigenous people have nominal ownership rights, the control and management of land is vested in the NLTB for the benefit of the traditional owners.

Strengths

Communal ownership of native lands is constitutionally entrenched and reflected in the statutory framework under the Native Lands Act and Native Land Trust Act. This is both a strength and a weakness however, as the national law recognizes customary ownership in terms of the right to use the land, and does not recognize full title to the land (see below).

Weaknesses

Ownership of terrestrial lands and the coastal marine zones is an unresolved issue at law. While customary owners assert their ownership interest in their traditional lands, the laws of Fiji maintain that the government owns the land with only user rights for indigenous people. Section 19 of the *Native Lands Act*, for example, states that all lands left vacant by the discontinuance of a *mataqali* landholding unit will revert to the Crown. Without legal recognition of title to the coastal zones, indigenous people with customary rights to an area are not guaranteed the opportunity to make important decisions on planning and development of their traditional lands.

Fisheries Act, 1991

The *Fisheries Act* enables limited community involvement in coastal marine management via provisions that require community consent over commercial and subsistence fishing in their customary fishing rights areas (*qoliqoli*). The law allows for the involvement of communities in the governance of the coastal zones and the application of customary laws to regulate the *qoliqoli* in some circumstances. The Act also creates the position of honorary fish wardens, who are community members appointed to protect the jurisdiction of customary rights holders in the *qoliqoli* areas.

Section 13 of the *Fisheries Act* is the window through which customary law may be applied to govern the coastal marine areas. The provision requires commercial and non-commercial harvesters to obtain a permit from the customary owner of the *qoliqoli*, with a few exceptions. Section 13 and Regulation 4 of the Fisheries Regulations require both commercial and non-commercial harvesters to obtain a permit to fish on any reef or shellfish bed in a registered *qoliqoli*, with a few exceptions. For commercial harvesters, this is a precondition on obtaining a license to fish in the area. An exception is contained in the Act for non-commercial harvesters who use a hook and line, spear or portable fish trap that can be handled by one person.

Strengths

The licensing and permit system under Section 13 allow customary owners to exercise jurisdiction over the *qoliqoli*. Any fishing by harvesters from outside the community must obtain a permit from the District Commissioner, which in practice must be based on the approval of the local chief.

While fishing cannot be completely prohibited by the *Fisheries Act* and Regulations, this may be a good thing as it ensures subsistence indigenous fishing rights in a country where the main source of protein for rural people is from marine resources.

Weaknesses

Under the current *Fisheries Act*, it is legally impossible to establish a marine protected area where fishing is strictly prohibited. While both commercial and subsistence harvesters need a license or permit to enter a *qoliqoli*, the exceptions under the Fisheries Act for certain methods mean that it is legally impossible for a community to set up a protected area without ministerial designation. This gap in the law has led to many complications related to enforcement by the community of both customary and national fisheries laws. In addition, though the definition of "fish" under the *Fisheries Act* is broad, non-living marine resources seem to be beyond the ambit of the Act, and so may not benefit from protections under the Act.

National Trust of Fiji Act, 1970

This law establishes the National Trust of Fiji, with an overall purpose to provide for the sustainability of Fiji's natural and cultural heritage. In discharging its mandate the National Trust is empowered to enter into conservation agreements with landowners.

Strengths

The mandate of this statutory body is broad and includes the protection, preservation and management of any site deemed significant to Fiji's natural and cultural heritage.

Weaknesses

Under the Act, landowners may enter into agreements or accept covenants to preserve a heritage area, but no role for landowners in terms of protection or management of these sites is stipulated under the Act.

Overall Comments

Protected areas may be established under various national laws – for example, the Fisheries Act and Regulations allow for the creation of marine reserves that prohibit fishing except by certain fishing methods. Other relevant legislation would include the Forestry Act and Forestry Decree, which allow for the creation of reserved forests and strict nature reserves, and the Environment Management Act (2005), which requires environmental assessments of development activities likely to have a significant impact on designated or proposed protected areas. The recognition of communal ownership of terrestrial lands (under the Constitution, Native Lands Act and other aspects of the land management framework) and fishing rights in relation to coastal marine zones (under the Fisheries Act) make it likely that customary owners will be engaged in the process of establishing and managing a protected area, but no legislation specifies the nature or extent of their role in these processes.

Further references

Erika J. Techera, "Customary law and community based conservation of marine areas in Fiji" (Paper presented to the Environmental Justice and Global Citizenship Conference, July 2007)

PAPUA NEW GUINEA

Suzie Kukuian, Centre for Environment Law and Community Rights, and Shauna Troniak

Recognition of Indigenous and Community Conserved Areas (ICCAs) in national law or policy or as part of the PA network system

The national laws of PNG do not expressly recognize community conserved areas, but such an arrangement may be arrived at indirectly via legal mechanisms examined in Section III (below).

The law in Papua New Guinea does not formally recognize CCAs as part of its network of protected areas. However, recent developments have shown that PNG will eventually adopt policies and laws that will establish and strengthen CCAs in a PA network.

Other general policies/laws that recognize indigenous/community territories or rights to areas or natural resources

Constitution of the Independent State of Papua New Guinea (1975)

The *Constitution of the Independent State of PNG* recognizes PNG customs as being part of the Underlying laws of the country as long as the custom is not inconsistent to any existing laws and is not repugnant to the general principles of humanity. This gives recognition to customary ownership by people of Papua New Guinea over their land which extends to the sea and natural resources. Having recognition of customs as part of the underlying laws means that all laws in PNG must take this into consideration to enable dual recognition at the national level and the community level.

Fisheries Management Act (1998)

The *Fisheries Management Act* makes it a condition of access and license holding the respect of local and community government laws, including and in particular the customs, traditions and customary rights of the indigenous inhabitants.

Fauna (Protection and Control) Act (1966)

The vast majority of protected areas in PNG have been established as "wildlife management areas" under the *Fauna (Protection and Control) Act,* which provides a mechanism for the community to control fauna on land and in water subject to customary tenure. Customary landowners may call for the establishment of a wildlife management area, and this engages a several-step process under the Act. This includes the establishment of a Wildlife Management Committee, the development of rules and penalties particular to the wildlife management area, and publication in the National Gazette. The process of establishing wildlife management areas however has stalled and no new areas are currently being gazetted.

Organic Law on Provincial Governments and Local Level Governments (1996)

In part as a response to the difficulties in formalizing protected areas under national laws, the national government developed a broadly based Decentralization Framework to give important legislative functions to lower levels of government. Under this structure, provincial and local level governments in PNG have legislative powers and functions over important areas like resource management, and have the right to consult on development measures. The *Organic Law on Provincial Governments and Local Level Governments*

devolves powers over natural resource use and sustainable development to each of the nineteen provinces and local level governments within the provinces. Provincial and local levels of governments thus have the power to establish and manage protected areas, and to arrange for community-based management of lands and waters held under customary tenure.

Communities may therefore have the opportunity to conserve their traditional sites under local conservation agreements. Locally Managed Marine Areas (LMMA), which are community initiatives, have already been given legal recognition in this way. Under this system, local level governments have the power to enact local environmental laws, including laws related to resource management and protected areas, imposition of fines for breach of its laws, and protection of flora and fauna. Local level conservation agreements between communities and local level governments may thus be constituted under the authority granted by mainly the *Organic Law*. Based on this, the declared taboo areas are given legal recognition when a local level government passes a local level law on Terrestrial and Marine Environment to set aside protected areas/ taboo areas. Breaches of the law are resolved according to the customs in the area where the village elder or chief will mediate. If a party or parties fail to reach an agreement or comply with a directive from the village elder, the conflict is brought before the Village Court under the *Village Court Act*, which will apply custom and the provisions of the specific *Terrestrial and Marine Environment LLG Act* and the *Village Court Act*.

Strengths

The devolution of power to local level governments has the potential to make government representation more responsive and the process of establishing a protected area more practical for the communities involved. Entering into formal conservation agreements with local governments gives communities access to the local court system and additional means of enforcement.

Weaknesses

Local level governments generally lack the capacity to manage and enforce protected areas. Practical problems related to enforcement apply equally to offences written into the national laws, under local laws, and those solely under customary law. In practice, when community members violate the terms of the protected area, internal rules apply to resolve the issue. The village court system deals with violations done by those not resident in the community; the village courts may impose penalties according to local custom, and fines that may or may not be monetary. A lot therefore depends on the capacity and motivation of the community to enforce conservation agreements, which naturally will vary from community to community.

Overall Comments

The concept of Community Conserved Areas is very applicable and relevant to the circumstances of PNG, but policymakers and legislators have not met this need as yet. Several national laws relate to biodiversity, and in particular to protected areas. These include the *National Parks Act*, the *Fauna (Protection and Control) Act*, and the *Conservation Areas A*ct. Each of these laws focus on terrestrial ecosystems. Under the *Fauna (Protection and Control) Act* and the *Conservation Areas Act*, establishing or regulating a protected area is the function of the responsible Minister, in consultation with the affected owners and lower levels of government. Under the *Fauna (Protection and Control) Act* and the *Conservation Areas Act*, local resource owners must agree to the conversion of their lands for conservation purposes. No consultation with communities is provided for under the *National Parks Act*. Other national laws that relate to the preservation of biodiversity include the *Physical Planning Act* (1988), the *Environment Act* (2000), and the *International Trade (Flora and Fauna) (Amendment) Act* (2003).

Further references

Flip van Helden, *Lessons Learned in Community Based Conservation in Papua New Guinea* (The Nature Conservancy and WWF Papua New Guinea, July 2005)

SOLOMON ISLANDS

Shauna Troniak and Hugh Govan

Recognition of Indigenous and Community Conserved Areas (ICCAs) in national law or policy or as part of the PA network system

CCAs are not formally recognized in national legislation.

The Solomon Islands cannot be said to have a representative network of protected areas, does not have dedicated protected areas legislation, and there is no national system for site selection or guidelines for the establishment of protected areas.

Other general policies/laws that recognize indigenous/community territories or rights to areas or natural resources

Constitution, 1978

The *Constitution* recognizes the right of landowners to exercise control over their lands and resources. Also, the Solomon Islands shall "cherish and promote the different cultural traditions" and that Parliament shall make provision to apply customary laws with particular regard to the customs, values and aspirations of the people of the Solomon Islands. Schedule 3 to the *Constitution* confirms that customary law is part of the national law so long as it is consistent with the *Constitution* or a national law; an Act of Parliament may regulate the manners in which customary laws are applied.

Strengths

Customary fishing rights and traditional land ownership are recognized in the Constitution. Land reservation for the purpose of conservation would therefore affect customary rights, and communities would be engaged in this process.

Weaknesses

The legal meaning and extent of customary land ownership is unclear. High court decisions have found that traditional owners do not own land under the high water mark although customary landowners have in practice been consulted and compensated when land is taken up by the government for public purpose.

Fisheries Act, 1998

The *Fisheries Act*, in accordance with the constitution, recognizes customary fishing rights. The Act vests responsibility for coastal and inshore fisheries with each of the nine provinces. Provincial assemblies may enact ordinances to perform essential fisheries management functions, including: creating measures for the development of the fisheries, including fisheries management plans; registering customary fishing rights, boundaries and persons entitled to these rights; designating open or closed seasons for fishing of species or within any areas of provincial waters; designating closed fishing areas; and establishing marine reserves. A Fisheries Advisory Council is constituted under the Act, a key role of which is to endorse fisheries management plans, and these may follow a community based management approach. Further provisions in the *Fisheries Act* make commercial fishing subject to customary fishing rights, require compensation be

paid to customary owners in event of a breach of customary fishing rights, and create an offence for failure to comply with a compensation order. Though provincial governments have the power, there is no noted provincial ordinance that applies customary fishing rights.

Strengths

The Fisheries Act is based on sound principles for sustainable development and protection of biodiversity. Another of its stated core principles is the regard for "any customary rights of customary rights holders over or in relation to any area within Solomon Islands waters" (Section 4).

Weaknesses

Problems relate mostly to implementation, or the capacity of the national fisheries department and provincial officers to carry out the provisions of the Act. No formally endorsed fisheries management plans have been implemented at either provincial or national levels. The Fisheries Advisory Council is reportedly not carrying out its functions as under the Act, and there is a shortage of skilled staff within the national Department of Fisheries and Marine Resources to provide the necessary support to fisheries officers in the provinces or to the communities that want to undertake community based fisheries management plans.

Overall Comments

Under the Fisheries Act, provincial governments have the power to implement customary law in the coastal zones, but have not apparently chosen to exercise this power. Decentralization may therefore be in general a positive feature of any legal regime that implements community based coastal marine management, but cannot itself ensure positive outcomes for the community as much depends on capacity.

Further references

Jackie Healy, *Solomon Islands' Fisheries, Marine and Coastal Legislation and Policy Gap Analysis* (WWF Solomon Islands, May 2006).

P. Lokani and W. Atu, "Community Leadership in Managing the Arnavon Marine Conservation Area" in JC Day et al., eds., *Proceedings from First International Marine Protected Areas Congress*, October 2005.

VANUATU

Jess Feehely and Roy Hills, with inputs from Antoine Lasgorceix and Shauna Troniak

Recognition of Indigenous and Community Conserved Areas (ICCAs) in national law or policy or as part of the PA network system

Environmental Management and Conservation Act, 2002

Under Part 4, Division 2 of the **Environmental Management and Conservation Act, 2002**, the Director of Environment can register an area as a Community Conservation Area (CCA). Identification of such sites is made by negotiation between the Director and customary landowners. Communities must agree to establish the CCA, and no site may be registered without the assent of the customary landowner. The Director can negotiate with the custom landowners for the protection and registration of *any* site as a CCA, provided the Director is satisfied that the area: (i.e. there are no restrictions on government or community ownership of land comprising a CCA)

(a) Possesses unique genetic, cultural, geological or biological resources.

(b) Constitutes the habitat of species of wild fauna or flora of unique national or international importance.

(c) Merits protection under the *Convention Concerning the Protection of World Cultural and Natural Heritage*.

Registering a CCA provides formal recognition of the environmental values of the area and conservation activities to protect the area. A registered CCA must have an approved management plan, and a management committee (comprising representatives from each community within the protected area) who will be responsible for implementing and enforcing the management plan. The *EMC Act* is the responsibility of the Ministry of Lands, Natural Resources, Geology, Energy and Environment, and is administered by a government agency called the Vanuatu Environment Unit. The Environment Unit may provide money or technical advice to help plan the conservation and management of the area. The Committee must report to the Environment Unit each year describing the conservation activities that have been carried out that year, achievements and any punishments for non-compliance. Communities may negotiate with the Director the boundaries of the CCA[1] and the rules that take effect within it.[2] Customary landowners may also apply to the Director to cancel or modify the CCA, or amend the management plan;[3] this is followed by a mandatory consultation between the Director and the applicant landowner and/or other interested parties.[4] In addition, the CCA may be de-registered if the management plan is not being implemented.

Strengths

In practice, this system allows the community the opportunity to significantly influence the form and content of the management plan, which may lead to the incorporation of traditional knowledge, as well as customary landholders' issues and concerns.

1 *Supra* note 206, ss. 35 and 36
2 *Supra* note 206, s. 36(d)
3 *Supra* note 206, s. 38(1)
4 *Supra* note 206, s. 38(2)

The registration of CCAs provides formal recognition for community based conservation management and keeps primary responsibility for management at a community level. The Environment Unit can provide assistance, such as:

- Assisting with monitoring and gathering baseline data about the proposed CCA.
- Preparing an accurate map of the proposed CCA.
- Assisting in the resolution of outstanding land ownership issues (The Environment Unit does not register any CCA where there is an unresolved land dispute).
- Identifying all the options to achieve conservation objectives and assisting with preparation of a formal management plan.

The fact that CCAs are established and registered at the request of the local community should improve implementation of conservation measures and compliance with management plans.

Weaknesses

The main weakness relates to enforcement. The landowners or the management committees are responsible for the implementation of the management plan; however, there are no provisions in the legislation that give the landowners power to make regulations to enforce the plan. In practice, communities are primarily responsible, with government support, for monitoring and enforcing the management plan through chiefly authority structures. Therefore, enforcement relies on respect for custom rules and chiefly powers. This is particularly difficult where the offenders are not from the CCA. It is an offence to contravene any "*term or condition of a registered community conservation area*". However, it is not clear whether this would include compliance with the prescriptions of any management plan endorsed by the Director, or if it is intended only to apply to failure to carry out responsibilities relating to the management plan. No action has been taken by the Environment Unit to date in relation to breaches of a management plan for a CCA.

Vanuatu does recognize CCAs as a part of the PA network system. Registered CCAs are entered into the Environmental Registry, after which they receive government recognition along with all other PAs. **But there are some weaknesses to be noticed**. As above, management of a CCA is the responsibility of the landowners, rather than the government (in contrast to conservation areas under the **Forestry Act, 2001** or marine reserves under the **Fisheries Act, 2005**, where the relevant government department is responsible for regulating activities in the PA). It is currently difficult for the landowners or the Environment Unit to take any action to prosecute someone for breaching conditions of a management plan for a CCA – penalties can only be imposed at a custom level. Depending on the strength of the management committee, this may mean that CCAs are less regulated than other PAs.

Overall Comments

There are a number of options for recognizing PAs in Vanuatu – including conservation areas under the **Forestry Act, 2001**, marine reserves under the **Fisheries Act, 2005**, protected sites under the **Protection of Sites and Artifacts Act** and national parks and nature reserves under the **National Parks Act, 1993**. The Provincial Councils are also empowered to create environmental protection zones under the **Decentralization and Local Government Regions Act, 1994**. However, these options tend to be under-used (e.g. there are no national parks and the only formal marine reserves declared to date are for the protection of tourist dive sites).

The *EMC Act* expressly applies to coastal marine areas, and its provisions may overlap in certain circumstances with provisions aimed at conservation contained in the *Fisheries Act*. It is presently unclear how the *EMC Act* and *Fisheries Act* interact in practice, though generally the more stringent provisions would presumably apply

in the event of a direct overlap. Under the *Fisheries Act*, the Minister may designate special conservation or protection measures for certain fisheries, and may also designate marine reserves and make regulations for the establishment, management and protection of marine reserves. The *Fisheries Act* obliges the Minister to consult with owners of adjoining land prior to the establishment of a marine reserve. As a matter of policy, government agencies working under the *Fisheries Act* do engage with and support communities when they must be consulted prior to the establishment of a protected area.

Hopefully, the community-based nature of the CCA provisions of the **Environmental Management and Conservation Act, 2002** will lead to the registration of more PAs as CCAs. However, the system will be more effective if changes can be made to improve the capacity of landowners to take action to enforce their management plans.

Further references

Tom Y.D and Hakwa M.T., *Review of Environmental Legislation and Policies in Vanuatu*, 2004, International Waters of the Pacific Islands, SPREP

Erika J. Techera, "Protected Area Management in Vanuatu" (2005) 2 MqJICEL 107-119.

SAMOA

Shauna Troniak

Recognition of Indigenous and Community Conserved Areas (ICCAs) in national law or policy or as part of the PA network system

CCAs are not specifically mentioned in Samoan law.

There is no reference to CCAs in Samoa's existing PA system, however community based conservation is not expressly barred and in at least one case permitted by exception. Under the *National Parks and Reserves Act, 1974*, nature reserves may be established on any public land or area of the territorial sea. Although this provision is geared toward strict nature reserves, this is with the proviso that no nature reserve may restrict the access of rights holders to their customary fishing areas.

Other general policies/laws that recognize indigenous/community territories or rights to areas or natural resources

Constitution of the Independent State of Western Samoa, 1960

The *Constitution* provides for a system of customary lands held by chiefly title in accordance with customary law and practice, though this does not on its face include land below the high water mark. Under Article 102, customary land may be taken up by the government for public purposes by negotiation or unilaterally.

Strengths

In practice land is taken up by the government usually by means of negotiation. Land below the high water mark appears to be exempt from possible expropriation.

Weaknesses

Rights to consent to this type of expropriation is not guaranteed.

Village Fono Act, 1990

Customary laws and structures are recognized under the *Village Fono Act*, a national law enacted for the purpose of reinforcing the authority of village fono (council of chiefs) to use and apply the custom of the village. The *fono* is empowered to make laws with respect to the management of their customary lands, and enforce these laws against the residents of the village.

Strengths

The law gives statutory recognition to the processes and by-laws enacted by customary authorities.

Weaknesses

The jurisdiction of the *fono* is therefore limited to planning and management of its own lands and enforcement against members of its own community. Individuals from outside the village are subject only to government laws and law enforcement while on village lands, and the decisions of the *fono* do not necessarily affect land

management and attendant environmental issues at the district or regional level. Another key gap in the laws is that, on its face, the *Village Fono Act* does not apply to coastal marine areas.

Fisheries Act, 1988

Under the Fisheries Act the fono may prepare and enforce laws of general application within their customary fishing areas. The *Fisheries Act* allows village representatives, fishermen and industry to prepare by-laws in consultation with the Fisheries Department. Under an amendment to the *Fisheries Act*, village *fono* may impose penalties on any person who breaches a by-law. By-laws cover a range of issues related to the conservation and management of the fishery resources, and may include restrictions on fish sizes, bans on certain fishing gear or methods, and closures of fishing seasons or areas (*tabus*).

Communities engage in monitoring village by-laws by erecting signs, building watch houses, and using watchmen to patrol their coastal areas. Village *fono* often incorporate existing Fisheries regulations into their by-laws, and may thus become the main monitoring and enforcement body of these rules in their customary fishing areas. When a community member breaches a by-law, the village *fono* handles enforcement and may impose a traditional fine, or a fine not exceeding 100 penalty units and not more than 10 penalty units for each day the breach continues. Any breach of the by-laws should be reported to police, and breaches by individuals from outside the community may be pursued through the court system. Fisheries Enforcement Officers, whose job is to enforce the *Fisheries Act*, are responsible for taking prosecutions through the court system against those from outside the community.

Strengths

The Fisheries Act addresses the main weaknesses in the Village Fono Act, which does not apply to the coastal zones nor to persons from outside the community. The ability to enact laws of general application is a significant power that has been devolved to the village fono. This effectively extends the jurisdiction of village fono to any person who breaches a by-law within the community's customary fishing area.

Weaknesses

The jurisdiction of the village fono is not absolute, though this may not necessarily be termed a weakness in the law. As subsidiary legislation, fisheries by-laws must comply with national laws and regulations in order to be enforceable. The Minister has the authority to manage the fisheries, control harvesting methods and prevent marine pollution through the formulation of regulations.

Overall Comments

With respect to the coastal zones, the Samoan government established the Fisheries Extension Programme in 1995, in order to maximize community participation in the management of subsistence fisheries and marine environments. A central feature of the Extension Programme is the development of community-based Fisheries Management Plans, which are facilitated by Fisheries Division staff and are passed by village *fono*. Village by-laws are seen as an important management tool within this process. As of March 2007, 87 coastal villages had developed Fisheries Management Plans, 69 marine reserves had been created, 57 by-laws had been approved via the process outlined above, and 21 more by-laws were in the pipeline.

Further references

Ueta Fa'asili and Autalavou Tauaefa, *Review of the Village Fisheries Management Plan of the Extension Programme in Samoa* (Field Report #7, Secretariat of the Pacific Community, 2001).

Erika J. Techera, "Samoa: Law, Custom and Conservation" (2006) 10 N.Z. J. Envtl. L. 361-379.

ANNEX 4 COSTS OF IMPLEMENTING LMMAS AT SITE LEVEL

Worldfish Center ACIAR-funded project, Isabel and Western Province, Solomon Islands[1]

The Worldfish Center ran an ACIAR funded project over three years in Solomon Islands. This research project had wider goals of information collation, publication, dissemination and staff capacity building but also resulted in the establishment of 26 no-take zones in two districts in Isabel and Western Provinces. The average yearly cost to establish and support each site was some US$ 3,000 working out at around US$ 3,500 per km^2. A large number of staff were involved given the research and capacity building aspects of the project which is reflected in staffing costs amounting to more than 50%, with travel and supplies coming to around 15% each. It is likely therefore that the costs directly associated with setting up and maintaining each site are considerably less (perhaps by 30%). An additional consideration is that the management plans contemplate the wider sea area of these sites to which restrictions other than no-take are applied. This area comes to some 500-1000 km^2 and would imply a management cost per km^2 in the order of US$100.

WWF Darwin Initiative project, Western Province, Solomon Islands[2]

WWF implemented 4 community MPAs in Solomon Islands consisiting of a total of 13 no-take zones some periodic and others permanent over three years funded by the UK Darwin Initiative. The project had a strong component focusing on developing alternative livelihoods as well as emphasis on monitoring, surveys, research and policy development. The average yearly cost per cluster of sites (4) came to some US$16,000 without counting the alternative livelihood component which added another 20%. The yearly cost per closed area was US$5,000 and per km^2 about US$2,900. The breakdown of costs was around 35% on salaries, 23% on surveys, research and staff training, 12% on workshops and the remainder was distributed between capital, overheads and other activities. The costs are averages and some sites were more remote than others and could be expected to cost more. In addition, the broad objectives of the project mean that it is likely that the specific cost of supporting the community based management was considerably less, perhaps by some 25-50%.

Coastal Fisheries Management and Development Project (CFMDP), Morobe and Kavieng[3]

The ADB-funded CFMDP project implemented community based management as part of a wider program for Provincial capacity building which included a consultative process towards the establishment of a Provincial Fisheries Management and Development Strategy and specific Fishery Management Plans for Fisheries of Interest. The approach consisted of some 5 visits per community in which awareness was raised, a community management plan developed (3 trips) and subsequently launched. Monitoring and follow up trips were envisaged but never undertaken. The approach resulted in some 13-16 communities with management plans in Morobe and 9 in Kavieng.

Activities in support of CBM development were linked where possible to the wider consultative process and in many cases field trips were scheduled visits to multiple CBM sites as a means of cost saving given the cost of transport required to most sites.

1 Cost breakdown provided by Ann-Maree Schwarz

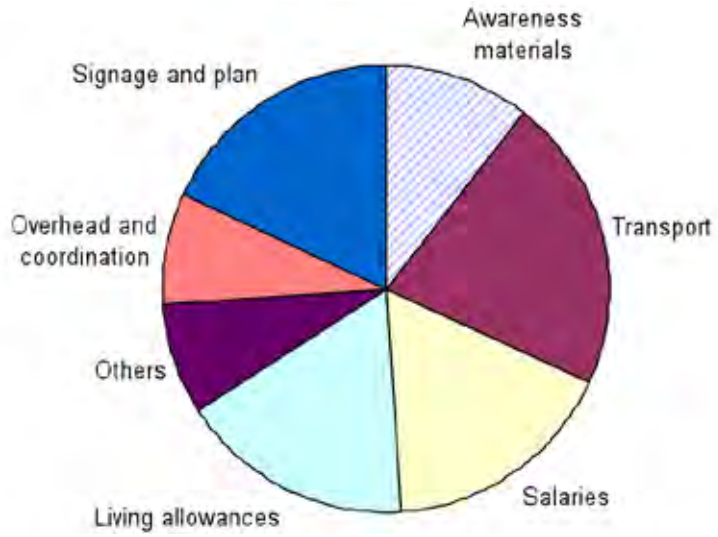
2 Data from proposal budget provided by Jackie Thomas

3 Cost breakdown provided by Hugh Walton

The project did not monitor the specific costs associated with the establishment of each CBM plan but an indicative breakdown was attempted assuming that the CBM process happened at a site at a time and in isolation of other consultation or fisheries development activities.

Under the above scenario, establishing a CBM plan cost some US$3,800 per community with follow up trips expected to cost US$600. The main costs are illustrated in Figure A4 – 1. Indicative breakdown of costs for establishment of Community Based Fisheries Management plans in Morobe, PNG, under the CFMDP project. Total cost US$3,800 (data provided by Hugh Walton). and consist of salaries and living allowances (17% each), transport (21%), signage and management plan publication (18%) and awareness materials (11%). Apart from the management plans, signage and awareness materials, a further 8% remained with the village in the form of a contribution to the celebratory feast and tee-shirts. In practice, significant savings were made in the travel allocation by combining trips with other activities and/or nearby villages so a saving of up to 15% overall might be achieved bringing the overall cost below US$3,000. The time period over which the plans were established is not known nor the precise area managed or designated no-take so calculation of costs per year or per km^2 are not possible.

Figure A4 – 1. Indicative breakdown of costs for establishment of Community Based Fisheries Management plans in Morobe, PNG, under the CFMDP project. Total cost US$3,800 (data provided by Hugh Walton).



FSPI Expanding community based management, Solomon Islands

The Foundation of the Peoples of the South Pacific International (FSPI) has been supporting partners in Solomon Islands to implement community based management since 2002 with funding from SPREP, MacArthur Foundation and the Coral Reef Initiative for the South Pacific (CRISP). FSPI and its local partners have an overall goal of supporting sustainable community development and support for community marine resource management was provided in that context rather than from a strictly conservation or fisheries perspective.

The FSPI approach also explicitly acknowledged that successful approaches needed to be highly cost-effective and that for long term sustainability government institutions needed to be involved from the outset with a view to their ultimately utilizing the successful aspects in nation-wide approaches[4]. These features have implications for the costing analysis in that costs were purposely kept as low as possible (i.e. inputs reduced), national and provincial Fisheries Departments were routinely involved in joint activities (usually in-kind provision of staff and a canoe hull) and that investment was made in national and upscaling initiatives in the form of support for a national network (Solomon Islands Locally Managed Marine Area network – SILMMA).

4 Govan et al. 2005, Govan 2005

Costing was based on the overall project budget for 2006 by averaging costs for the 20 communities and 17 no-take zones, spread over 3 provinces with differing logistical and socio-cultural circumstances. The analysis does not differentiate between sites that were relatively well-established and those that were still at early stages of implementation. Table A4 – 1. Budgeted costs in 2006 for support of community based management at 17 sites in Solomon Islands (data Govan unpublished and FSPI).1 shows the total project funds expended on community based management and provides estimates of the inputs provided by the national government in the form of staff participating in project activities and FSPI secretariat in the form of technical support. FSPI and the LMMA network also supported the national network SILMMA which provided some training and exchange opportunities, a proportion (SILMMA budget divided between the 7 participating organizations) is also included.

Table A4 – 1. Budgeted costs in 2006 for support of community based management at 17 sites in Solomon Islands (data Govan unpublished and FSPI).

	Overall costs (US$)	Percent total	Percent project
National project costs	$37,019	72%	100%
Personnel	$15,266	30%	41%
Travel	$10,388	20%	28%
Workshops/trainings (inc. per diems)	$7,000	14%	19%
Office/field equipment and admin	$4,115	8%	11%
Communications	$250	0%	1%
Government support	$3,500	7%	
National network support	$2,857	6%	
International technical support	$8,000	16%	
	$51,376	100%	

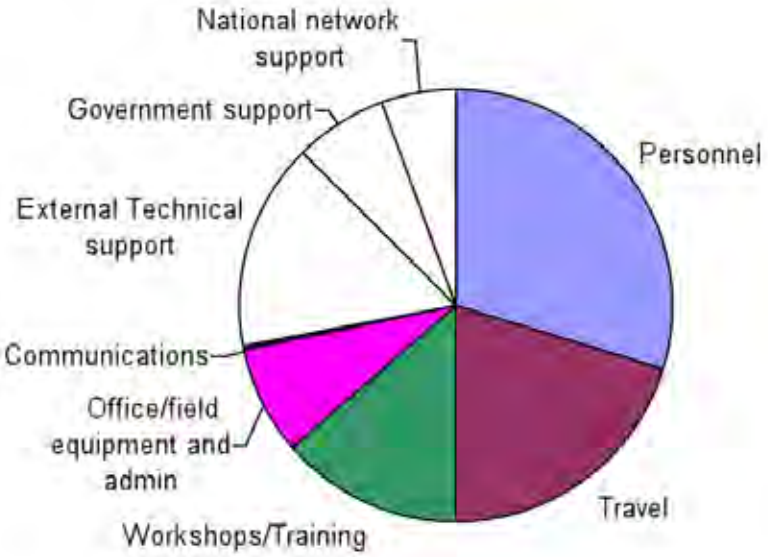
Support was provided to communities to improve resource management and these ultimately decided their strategy, thus 3 communities decided to implement 1 common no-take zone (NTZ) and a further 3 communities implemented 2 NTZs. The average cost per community, per NTZ and per km^2 of NTZ is shown in TaTable A4 – 2. Average costs of sites, no-take zones (NTZ) and per square kilometer of NTZ for 17 sites in Solomon Islands for 2006. It is notable that while cost per community is very low the cost per area protected is higher given the relatively small areas that communities chose to place under protection. However, community management plans often cover the wider traditional fishing grounds for which area estimates are not known.

Table A4 – 2. Average costs of sites, no-take zones (NTZ) and per square kilometer of NTZ for 17 sites in Solomon Islands for 2006.

	Number	Total costs (US$)	Total – project costs only (US$)
Total		51,376	37,019
No Take Zones (NTZ)	17	3,022	2,178
Communities	20	2,569	1,851
Area of NTZ (km^2)	7.99	6,432	4,634

The proportion of expenditure on various headings is illustrated in FigFigure A4 – 2 . Proportion of expenditure on major headings in support of community based management in Solomon Islands. Direct project costs are shaded and indirect or externally funded costs are not. Note that "workshops" includes living allowances of staff attending.nd personnel (national NGO, international technical and government) comprise more than half the costs. Travel and workshops/living allowances make up most of the rest. As the project progresses reliance on external technical support has reduced and as more sites move towards ongoing implementation costs overall are expected to reduce.

Figure A4 – 2 . Proportion of expenditure on major headings in support of community based management in Solomon Islands. Direct project costs are shaded and indirect or externally funded costs are not. Note that "workshops" includes living allowances of staff attending.



FSPI Supporting community based management, Vanuatu

The same project as implemented in Solomon Islands (above) is operating in Vanuatu with a similar overall budget and heading allocation. Differences include an actual allocation towards government staff allowances in addition to routine joint activities, a reduced number of sites (9 communities) and larger no-take zones (totaling 22.8 km^2). Though a complete analysis was not performed, an approximation of costs is presented in TabTable A4 – 3. Average costs of sites, no-take zones (NTZ) and per square kilometer of NTZ for 10 sites in Vanuatu for 2008.or 2008. Essentially the same number of staff as in Solomon Islands supporting fewer sites raises the cost per site but these sites allocated larger areas to NTZs which reduced the per km^2 cost.

Table A4 – 3. Average costs of sites, no-take zones (NTZ) and per square kilometer of NTZ for 10 sites in Vanuatu for 2008.

	Number	Costs (US$)
Total		49,830
No Take Zones (NTZ)	10	4,983
Communities	9	5,537
Area of NTZ (km^2)	22.78	2,187

Rarotonga, Cook Islands, ra'ui[5]

The late 1990s saw the setting up of a number of traditional fishing reserves or ra'ui in Rarotonga. WWF in partnership with the government agencies concerned are currently supporting the re-establishment of these. The main activities involved are workshops, monitoring or surveys, education and awareness and plan preparation and signage. These activities are listed in TableTable A4 – 4. Indicative activities and costs to set up a ra'ui (traditional fishing reserve) in Rarotonga, Cook Islands (sources J. Evans, M. Matepi and K. Raumea).ing indicative costs where available. Monitoring is performed by the Ministry of Marine Resources and awareness and other services provided by the National Environment Service. The overall costs in establishing a ra'ui are something over US$5,000 plus a proportion of NGO and government staff time, possibly amounting to an additional US$4-5,000. The ongoing costs of supporting a ra'ui would involve monitoring and continued meetings, awareness and training the cost of which would depend on frequency – assuming every two years this would be around US$2-3,000 per year including staff time. Currently there are 6 ra'ui on Rarotonga with an average size of 0.35 km^2 (ranging from 0.04 – 0.9 km^2).

Table A4 – 4. Indicative activities and costs to set up a ra'ui (traditional fishing reserve) in Rarotonga, Cook Islands (sources J. Evans, M. Matepi and K. Raumea).

		USD
Workshop/training	Catering/facilitators/communications/transport/venue/materials	2,196
Marine resource monitoring	Surveys/monitoring carried out by Min. Marine Resources	1,785
Educations and awareness	Press releases, school competitions, community materials	549
Signage	Min. Marine Resources	NA
Launch of ra'ui	Food	NA
Management plan	Document preparation	NA
Accommodation	Various hotels/motels (in-kind)	NA
Awareness materials	National Environment service (in-kind)	NA
Total per ra'ui set up		4,530
Staff time – 1 year	NGO MPA officer (full time), Marine Resources and Nat. Env. Service (e.g. 20 person days)	17,571

Aleipata and Safata MPAs, Samoa[6]

The Aleipata and Safata MPAs (ASMPA) were established over a five year project between 2000 – 2005 funded to the sum of US$900,000 by the Global Environment Facility and with cash and in-kind contributions from other donors, government and the community contributing a similar amount. Given these relatively large investments concern has been expressed regarding whether the government would be able to support the ASMPA after the project's end in 2005[7].

The operational budgets for Aleipata and Safata MPAs for the years 2005 and 2006 came to US$ 16,000 and US$19,000 respectively with 61–67% attributable to salaries and the rest to operations such as monitoring, routine meetings (transport and food), maintenance of the MPA information centre and traditional obligations. The salaries supported one district officer and a caretaker per MPA.

5 Information provided by J. Evans, M. Matepi and K. Raumea. Calculations and tabulation the author's own.

6 Data provided by MCS 2008 and Pulea Ifopo

7 Reti and Sullivan 2005.

Funding constraints and other circumstances have led to a reduced budget for 2008 of around US$13,500 for Safata MPA with 69% covering the district officer, 23% the caretaker and 8% towards operational expenses. Aleipata MPA staffing needs is covered by the district officer for Safata and the entire budget of US$1,000 is allocated to operations. Four staff from the Marine Conservation Section of the Ministry of Natural Resources and Environment assist as needed with occasional assistance from the Fisheries Department. The annual area costs under these two scenarios are shown in Table Table A4 – 5. Average annual running costs for Aleipata and Safata MPAs under a scenario reflecting 2006 funding availability and a more recent reduced funding scenario.**ble A4 – 5.** Average annual running costs for Aleipata and Safata MPAs under a scenario reflecting 2006 funding availability and a more recent reduced funding scenario.

	Annual cost per km^2 of MPA (US$)	Annual cost per km^2 of strict no-take zone (US$)
Aleipata (2006 funding scenario)	360	8,394
Safata (2006 funding scenario)	534	4,471
MPAs combined (reduced funding scenario)	179	2,339

The reduced budget is considered to be sustainable but inadequate and it is hoped that the Ministry will be able to support part of the budget in future (staffing). The Aleipata and Safata MPAs have a trust fund of over US$105,000 from donor and community contributions which is expected to fund a third of yearly operating costs. Safata MPA has in addition received an average yearly contribution from tour operators of US$1,500 over the period 2005-2007.

Fiji Locally Managed Marine Areas – supported by Institute of Applied Sciences (USP)

The University of the South Pacific Institute of Applied Science has been supporting Locally Managed Marine Areas since 1996 and been an active member of the Fiji Locally Managed Marine Area network since its formation in 2001. The FLMMA network currently comprises some 217 sites of which IAS supports 170. Over the years support to communities requesting assistance to manage their marine resources has been streamlined, in the majority of cases workshops or site visits aim to serve as many communities as possible in a single event in order to improve cost efficiency.

Data in the form of accounting records at IAS are currently being analysed to provide detailed costs of support at a site level and so far information for three sites is considered sufficiently complete to be presented here[8]. While figures are derived from specific records of expenditure for different activities many of these are shared with other sites, so these costs, though calculated on a site basis, still reflect the prevailing regional approach of supporting clusters or networks of sites and distributing the main costs of manpower and transport across these. In this case the number of sites sharing activities such as workshops varies from 1 to 16.

The cost of supporting a site is expected to be higher in younger sites and decrease as ongoing adaptive management becomes routine. The three core sites are between 4 – 7 years old and show that average costs are around US$713 per year, slightly higher in the younger site and lower in Daku the oldest (Table ATable A4 – 6. Overall costs for supporting site groups and three individual sites in Fiji (US$).**able A4 – 6.** Overall costs for supporting site groups and three individual sites in Fiji (US$).

8 Govan, Tawake, Korovulavula and Tawakelevu – in preparation.

	Total support	Total for site	Years	Avg/site/yr
Daku	19,259	3,344	7	478
Nasau	10,537	3,750	4	938
Navakavu	6,578	3,625	5	725
			5	713

Workshops (awareness, planning and monitoring) incur the greatest expenditure (56%) while coordination accounts for some 37% and external activities vary much more widely and account for some 7% of cost on average. These activities may include some national networking but are generally accounted for by external research projects that may not contribute specifically to a given site's management and should probably be discounted.

The major input types appear to be living allowances comprising accommodation and per diems for participants (26%), salaries (23%), equipment (16%), transport (14%) and research, communications and overheads (~20%). As mentioned above, probably the costs of non-site targeted research should be removed (Table A4Table A4 – 7. Costs per site since start-up by input type (US$).gure A4 – 3).

Table A4 – 7. Costs per site since start-up by input type (US$).

	Daku	Nasau	Navakavu	Average	% total
Category					
Salary	841	1,149	442	811	23%
Transport	774	497	275	515	14%
Comms	83	32	0	38	1%
Overhead	607	135	547	430	12%
Living allow.	501	1,334	937	924	26%
Equipment	343	603	788	578	16%
Network	54	0	0	18	1%
Training/Exch	32	0	0	11	0%
Volunteers	0	0	0	0	0%
Research	108	0	636	248	7%
Total	3,344	3,750	3,625	3,573	
Years	7	4	5	5.3	

Figure A4 – 3. Breakdown of major inputs by budget heading to the three core sites.

Important to note here are the elevated equipment costs owing to expensive monitoring forms that are being piloted at each site, the relatively low salary component and the high living allowance allocation. Transport costs are reduced the nearer the sites to Suva and will escalate where teams rely on air travel.

The estimated costs on an area basis are some US$66/yr/km^2 for the total locally managed marine area and US$249/yr/km^2 for the no-take zone or tabu areas (Table A4 – 8).

Table A4 – 8. Costs per km2 for area under management and no-take zones in Fi

	km^2		Annual cost / km^2	
	LMMA area	NTZ area	LMMA	NTZ
Daku	5.92	2.87	81	166
Nasau	5.92	5.47	158	171
Navakavu	18.71	2.94	39	247
Tavua	690.77	13.61	1	51
Malawai	3.01	1.2	177	444
Votua	1,531.8	10.57	1	87
Naboutini	67.19	0.6	5	580
Avg	331.9	5.3	66	249

The sites sampled in these calculations represent some of the longest running and most studied in the FLMMA network. Recent approaches such as the Kadavu Yaubula Management Support Team suggest that with reduced monitoring and decentralization cost per site may be greatly reduced (~US$300/year) and costs per area would be expected to reduce by more than 50% as well.

The alternative approach to estimating site costs (as employed for other projects in this report) is to divide the total project expenses by the number of sites and years. Using this approach with the IAS site data: site-

based funds of about US$700,000 for about 170 sites or about US$4,000 per site. Assuming an average time of 5 years per site = USD$800/year. Some other funds were used but also some of the project funds were not used for site development[9]. The estimates match with the USD 713 estimated yearly cost above and give potentially some idea of a relatively small underestimate of the overhead component. Assuming an area of LMMA for the 170 sites of just over 10,000 km^2 and tabus covering some 550 km^2 (see Annex 1) this equates to costs of US$15 and US$266 per km^2 respectively.

Waitabu Marine Park in Taveuni, Fiji[10]

Waitabu Marine Park in Taveuni, Fiji, consists of an originally over-fished and severely depleted 27 Ha area of shallow fringing reef flat and slope which the community has protected from fishing for 10 years. Coral cover has been observed to increase and algal cover decrease in the protected area and the numbers and size of trochus and giant clams have increased. Data suggests that these invertebrates and some fish populations reached their zenith after 5 years of protection and have stabilised and remained fairly constant in the following years.

The community has run a snorkelling tourism operation since March 2001. For a half-day trip which includes a traditional boat ride to the snorkelling area, guided snorkelling, beach time, village tea and cultural experience, guests are charged US$20 (plus US$5 taxi fare). This income is immediately divided amongst those who take part (snorkel guides, boat captain, bilibili paddlers, tea ladies), expenses (boat fuel, tea supplies) and the project fund. The project fund is a bank account kept by the Waitabu Marine Park committee used to fund community projects at the committee's discretion and also to contribute to district projects within the Bouma Heritage Park. Between 2001 and 2007 some 1200 visitors have generated an estimated US$24,000.

Challenges faced include poor communications that hinder bookings and arrangements with resorts, poor access unattractive to taxi drivers, capacity of staff as guides and in first aid and generation of income through other sources such as souvenirs and handicrafts.

The estimated cost of supporting the Waitabu initiative includes the in-kind services of Marine Ecology Consulting which has probably contributed some US$30,000 over the past 10 years. Other inputs have been received in the form of a Peace Corps Volunteer.

Arnavon Community Marine Conservation Area, Solomon Islands

The Solomon Islands' Arnavon Community Marine Conservation Area (ACMCA) is located between the provinces of Choiseul and Isabel. The MPA itself consists of three small islands and their associated coral reefs covering some 158 km^2. The ACMCA was legally established in 1995 and co-managed by the three local communities in partnership with the provincial governments, the national government, and The Nature Conservancy. The Nature Conservancy has provided technical support and funding to the MPA for more than a decade[11] although the project has also been funded through the Global Environment Facility and the Biodiversity Conservation Network – total funding is likely to have surpassed the million dollar mark over the ACMCA's life[12].

More recently a sustainable financing strategy seems to have been secured in the form of an endowment of some US$400,000 which should cover the estimated US20,000 per year operating costs. Additional income is expected to accrue to the community in the form of fees from cruise ships (such as the Orion) which are visiting around 2 times per year.

9 B. Aalbersberg pers comm.

10 Sykes and Reddy 2008, Sykes pers. comm.. 2008, www.marineecologyfiji.com, www.waitabu.org

11 Leisher et al. 2007

12 The BCN and GEF projects contributed US$715,000 alone and estimate an additional US$280,000 of partner contribution. http://www.worldwildlife.org/bsp/bcn/ and Baines et al. 2002.

The Western Solomons Conservation Program, Solomon Islands

The Western Solomons Conservation Program explicitly provided "development projects" as an incentive or alternative for losses expected due to the implementation of the resource conservation program. Such projects could include the construction of a clinic or school or the support of a sewing project for example[13]. Within the context of a more broadly funded programme these development projects often but not always receive some US$5-10,000 on condition that the community provide labour and other inputs such as timber. The financial dependency that this may create is acknowledged but the intent is to demonstrate over time the tangible results that resource conservation can have in the hope that this will shift people's focus to the value of managing marine resources more comprehensively, a fundamental tenet is "seeing is believing" [14].

Seacology

Seacology[15] is an international environmental nonprofit organization that focuses on saving endangered species, habitats and cultures of islands throughout the world. The organization works by funding schools, community centers, fresh water systems or other needed infrastructure, or by providing services such as scholarships and medical supplies that islanders have requested in exchange for creating new protected areas. Until 2007 more than 26 marine areas had been protected by communities in Melanesia and Polynesia in exchange for Seacology contributions. Often these deals entail a 10 year undertaking to maintain protection and as an indicative example in one case US$ 23,000 was given to the community for construction of new school and renovation of teachers' houses[16].

13 Aswani and Weiant 2004.

14 S. Aswani Pers. Comm. 2008

15 http://www.seacology.org

16 J. Kinch pers. comm..

ANNEX 5 MARINE MANAGED AREA DATA SETS

Raw data have been provided to SPREP and national authorities.

Data sets are available online in GIS format at Reefbase.org

SPREP
PROE

CRISP
Coral Reef InitiativeS for the Pacific
Initiatives Corail pour le Pacifique

COMPONENT 3A - PROJECT 3A3
Institutional strengthening & technical support
Improvement of socio-economics of coral reefs

STATUS AND POTENTIAL OF LOCALLY-MANAGED MARINE AREAS IN THE SOUTH PACIFIC:

Meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs