

# **Projectised Epistemologies and Unintended Consequences:**

In consideration of Environmental Change and Marine  
Protected Area's in Marovo Lagoon, Solomon Islands.

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A thesis submitted in partial fulfilment of the requirements of a Bachelor of Arts  
with Honours Degree in the School of Social Science, The University of  
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## DECLARATION

This thesis represents my original work undertaken for a Bachelor of Arts Honours Degree at The University of Queensland, completed during 2006. The interpretations expressed in this thesis are my own unless otherwise indicated. This material has not been submitted either in whole or part, for a degree at this or any other university.

.....  
Mark Love  
5<sup>th</sup> June 2006

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## ACCRONYMS

APRA	Adventist Development Relief Agency
BP	Before Present
CAQ	Consensus/agreement questionnaire
CFC	Christian Fellowship Church
CMT	Customary marine tenure
COTS	Crown of thorns starfish
GEF	Global Environment Facility
HHS	Household survey
ICZM	Integrated coastal zone management
IWP	International Waters Project
LMMA	Locally managed marine protected area
LRFFT	Live reef fish food trade
MPA	Marine protected area
MUMPA	Multiple use marine protected area
NGO	Non government organisation
NTZ	No take zone
UQ	University of Queensland
SDA	Seventh Day Adventist Church
SIG	Solomon Islands Government
SPREP	Secretariat of the Pacific Regional Environment Programme

## GLOSSARY (non-English words used in thesis)

<b>Marovo words</b>	
<i>bangara</i>	Chief, senior male leader (chief)
<i>butubutu</i>	kin-based group
<i>chubina</i>	common ancestral connections
<i>hecha</i>	Season of southeast winds
<i>horevura</i>	'descend and emerge' (migration from 'bush' to 'coast')
<i>inatungu</i>	apical ancestor
<i>kapu</i>	Polynesian 'traditional' reef closure
<i>kino</i>	'way of life'
<i>lotu</i>	church
<i>mana</i>	power and efficaciousness
<i>mohu</i>	season of northwest monsoon wind; wet
<i>nginira</i>	power; <i>butubutu</i> 's right to control <i>puava</i>
<i>Panjara</i>	Coral trout
<i>palabatu</i>	important men, associates of chief
<i>pijin</i>	pidgin
<i>puava</i>	soil; customary territory
<i>kuhe</i>	jealousy
<i>soto</i>	lineage connections
<i>tinoni pa goanna</i>	'people of the bush'
<i>tinoni pa sera</i>	'people of the coast'
<i>tututi</i>	genealogical reckoning
<i>vivinei tuari</i>	stories of old

<b>Pijin</b>	
<i>wantok</i>	'one-talk'; context dependent - family, lineage or clan member
<i>kastom</i>	custom, shared 'traditions'; multivocal concept
<i>tabu</i>	sacred, holy, forbidden

## ABSTRACT

It is increasingly recognised that there is a global crisis in coastal fisheries. In the Pacific, as elsewhere, numerous actors and agencies have drawn from a basket of resource management approaches in an attempt to redress the marine degradation facing the region. One of the most salient management approaches has been the widespread implementation of ‘marine protected areas’ (MPAs). In this thesis I explore the human dimension of MPAs, from both a local and extra-local perspective, drawing on selected results from fieldwork conducted in Marovo Lagoon, Solomon Islands, to investigate some of the complexities surrounding two programs attempting to establish MPAs in the Marovo region. I specifically ask: What *a priori* assumptions and epistemological factors influence community **and** project perceptions of marine resource management, and; How do these factors impact upon the successful establishment of MPAs in this context?

This research demonstrates that while most (but not all) people are aware of the MPAs, they continue to openly fish inside their boundaries and the MPAs have yet to receive widespread community sanction. Moreover, the variety of anthropogenic activities currently, and increasingly likely to, impact on the lagoon suggests that even if effective, the permeability and restricted site focus of a few MPAs are, at this stage, unlikely to meet their conservation objectives. Nonetheless, avoiding polemic conclusions I do not discount MPAs as a management tool all together, but rather explore the **processes** associated with these conservation interventions to answer my research questions. Using the concept of ‘projectised epistemology’ I argue that accountability emerges as a key concern, and that these particular conservation programs are working within a process that is ‘designed to fail’ due to the directive, neat and overly homogenous framework in which they operate. I argue that if MPAs constitute the final end-game objective, rather than merely being a starting point, they will inevitably fail to meet their overall goal of mitigating marine degradation in the long-term.

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All errors, omissions and scholarly misgivings are my own.



# CHAPTER 1: INTRODUCTION

## Problem definition

Around the world there is an increasing awareness that marine resources and habitats are in critical decline due to over-fishing (Jackson *et al.* 2001; Pauly *et al.* 1998). One of the most salient resource management approaches used to attempt redress of this problem has been the restriction of fishing effort and/or access through the widespread implementation of 'marine protected areas' (MPAs) (eg. Aswani 2005; International Waters Programme (IWP) 2005; Seacology 2006; Locally-Managed Marine Area Network (LMMA Network) 2003). The increasing popularity of MPAs as a conservation tool is extraordinary, with the numbers of MPAs growing from a few hundred three decades ago to thousands today (Jones 2002:198). Nonetheless, numerous evaluations demonstrate that many MPAs are 'paper parks' and fail to meet their conservation objectives (Alder 1996; Kelleher *et al.* 1995). Scientists are increasingly cognisant that managing fisheries is primarily about managing humans (Mangel 2000 in Claudet and Pelletier 2004:134), and there is burgeoning literature dedicated to galvanising local support for MPAs (eg. Kelleher 1999; Pomeroy and Rivera-Guieb 2006). This thesis's primary aim is to explore this human dimension of MPAs, from both the local and extra-local perspective.

In the Pacific and parts of Asia there is a cultural and historical continuity associated with the temporal closing of reef areas or coastal zones to human extraction (Johannes 1978a). In part, it is this cultural congruency with customary marine resources management practices - such as *tambu* systems in Melanesia and *kapu* systems in Polynesia - that has provided the impetus and validation for the increasing implementation of MPAs (Adams 1998; Aswani 2000; Drew 2005; Johannes, 1978a, 1981; Lam 1998; Ruddle and Johannes 1985; but c/f. Foale and Manele 2003; Jones 2002:205). If there is such cultural continuity, one might reasonably ask, why the high failure rates of MPAs? What separates successful initiatives from failures? To answer these queries and explore the issue(s) further, in this thesis I ask two primary questions:

- What *a priori* assumptions and epistemological factors influence community **and** project perceptions of fisheries and marine resources management, and;
- How do these factors impact upon the successful establishment of MPAs in the context of Marovo Lagoon, Solomon Islands?

Using the heuristic optic of ‘problem’, ‘solution’ and ‘process’, combined with a ‘systems’ perspective, as advocated by Lemon Seaton (1999), and the anthropological prism of ‘counter-tendencies’ (Arce and Long 2000), I argue that the low success rates of MPAs can be understood largely through the prism of ‘process’.

Process can be defined as, ‘a series of actions that you take in order to achieve a result’ (Cambridge Dictionary Online 2006). I argue that many MPAs fail due to a number of process related factors. In the instances under investigation here, these include: the absence of proper engagement between project activities and the community; a directive and ‘closed-system’ perspective of environmental change and decision-issues; and an overarching assumptive paradigm of homogeneity. This ‘problem statement’ is not as obtuse as it might appear. Focusing on the processes of change, rather than merely seeking to identify causal relationships, is part of the ‘complexity program’ that acknowledges the dynamic and ‘messy’ nature of the real world (Byrne 1998; Lemon and Seaton 1999). It is an attempt to apply an ‘open-systems’ perspective and conduct what Lemon and Seaton (1999) refer to as ‘policy relevant research’ (1999:1-16). In particular, I concentrate on exploring the **projectised epistemologies** of the implementing agencies. By adding the suffix ‘-ise’ (meaning ‘to cause to become’), I mean to signal the transforming, active nature of **doing** that is associated with project activities, and overtly link this with the epistemological constructs which make up project ontology. In doing this, I challenge the inherent presumptions associated with project ‘pathways of change’ (problem definition, action/solution, and supposed problem resolution), which brings to the fore the linear, deterministic nature of the projectised process: MPAs constitute the end-state objective and there are no alternatives.

## **Rationale**

A critical appraisal of MPAs is overdue. Their ubiquitous use as a cure-all for ‘over-fishing’, and their spectacular failure to achieve their desired results (often because of the poorly understood social context of their implementation – see chapter 3), means that a critical evaluation of MPAs is essential. My rationale is to provide a review of the processes involved in recommending and implementing MPAs as a conservation solution, based on a case study approach from the Pacific where so many MPAs have been proposed. I also chose to undertake this investigation for three main reasons: (1) to re-engage critically with the pertinent ethnographic and Marovo-related literature after conducting some fieldwork; (2) to familiarise myself with the scientific literature concerning MPAs to gain an understanding of the ecological and biological factors associated with MPAs; (3) and develop some insights

into the limitations and potentials of MPAs as a resource management tool in the Marovo context.

This thesis also provides an opportunity to test some methodological approaches of social analysis, especially those relevant to investigations of community attitudes to natural resources management. My research has made me aware of the importance of intra-cultural variation, and how necessary it is to have practical methods with which such 'variables' can be identified and critically examined. In my experience, methodological issues are under-discussed in academic institutions and in the anthropological literature generally. The ability for good theory to derive from sound practice is regularly overlooked (Cernea 1996:25). Using research methods that are 'sensitive' to highlighting factors such as 'cultural boundaries' is of integral import to the future success of resource management projects and other applied contexts where social research is necessary.

### **Specific Aims**

The aims of this thesis are to:

- Provide a critical evaluation of the strengths and limits of marine protected areas (MPAs), from both a conservation and socio-cultural perspective;
- Explore the processes and complexities associated with the implementation of MPAs, using illustrative case studies from Marovo Lagoon, Solomon Islands;
- Investigate some of the relational processes and subsequent counter-tendencies associated with external interventions in this instance;
- Evaluate the case studies using an instructive list of 'factors of success' adapted from a wide literature review;
- Suggest alternative approaches and methods to marine conservation in the Marovo context; and
- Highlight 'gaps' in the existing literature and identify avenues for further research.

### **Research design**

This thesis is constructed from a number of specific, yet related research components, each designed to engage with two central research questions already introduced (see pp:1-2). To undertake this analysis I use two coastal villages from Marovo Lagoon, Solomon Islands, as primary case studies. Outside agencies have recently established MPAs in these communities territory: Seacology, an American conservation group and; the International Waters Project (IWP). All the primary fieldwork data I use in this study are derived from the fieldwork

activities I conducted in these villages as part of my involvement in the University of Queensland (UQ)-Marovo Project<sup>1</sup>, and the field methods I used were predicated on the aims and objectives of that project (see Chapter 4). At this introductory stage, I need only summarise that my fieldwork methods consisted of a number different survey based instruments, namely household surveys, semi-structured interviews, a cultural consensus analysis, focus group discussion and participant observation. Chapter 4 provides an overview of the methods used, including sampling procedures and other details.

An important component of my research design consists of an extensive literature review, which aimed to qualify my data and subsequent inferences with reference to other case studies and associated authoritative sources. The review includes an examination of specialist scientific (i.e. biological) and social (i.e. anthropological) literature, combined with numerous non-scholarly 'grey literature' resources (reports), both published and un-published, concerning MPAs, jurisprudence, community engagement, logging and oil palm production. Importantly, this thesis is contingent on a theoretical position that allows for critical deconstruction using a constructivist approach, without simultaneously undermining the realist assumptions inherent in the quantitative methodology and pragmatic aspirations of the work. In this regard, my overarching research design is informed by two complimenting paradigms: A ethnographic approach which is 'multi-sited' in focus, and a theoretical foundation which, while it could be categorised under a number of different rubrics, I choose to identify as a 'complex realist' approach.

This thesis is part of a 'multi-sited' research paradigm because it "...traces cultural formation across and within multiple sites of activities" (Marcus 1995:60). That is, I do not focus solely on the 'exotic other', but cast a critical gaze over all the "variously situated subjects" (Marcus 1995:96). The Marovo people's views on marine conservation and its management are examined alongside the views of NGO actors and agencies. Multi-sited research is predominately ethnographically based, and in this regard the present work is 'multi-sited' more in the general sense that I am dealing with the "global" not as a category "out there", but as an "...emergent dimension of arguing about the connection among sites" (Marcus 1995:99). This also fits well with the 'counter-tendencies' interpretation of social action provided by Arce and Long (2000) that make-up a component of my discussion.

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<sup>1</sup> University of Queensland ethical clearance Number: 2005000535, valid to 31 December, 2007. This fieldwork was NOT undertaken as part of the Honours thesis production. The fieldwork was done in my capacity as a member of the UQ-Marovo Project team. The results of that work appear elsewhere (Love and Ross 2006) and address the specific issues of that project. This thesis is a tangential (but highly relevant) examination of one small aspect of the UQ-Project data.

Although participant observation was an important part of my field methods ‘tool box’, I have endeavoured not to focus too much on ethnographic detail in the ‘thick description’ mould (Geertz 1973), due to the length requirements. Instead, I use interpretations of quantitative and (limited) qualitative field data and a critical review of the literature to inform my discussion. This tactic is also in accord with my personal interests and preference for qualifying and grounding anthropological interpretations and suppositions, where possible, with recourse to empirical, potentially replicable methods. The last comment needs further clarification, and is connected with the paradigm of ‘complex realism’.

‘Complex realism’ is a term used by Byrne (1998; 2002) to denote an approach in the social sciences that builds on Reed and Harvey’s (1992) proposition that by combining ‘complexity’ as a scientific ontology and critical realism as a philosophical ontology, social scientists can better understand the social world (Byrne 2002:5-6). While epistemological constructivism is valid and useful to a point, ontological constructivism is not as it ignores the reality that birth and death, health and sickness, resource depletion and environmental change etc., are not simply social constructions but are real events (Bunge 1993:9). The problem with the anti-realist stance of extreme ‘post-modernism’ (in its subjectivist or constructionist guise) is that it often posits, by way of logical extension, that nothing can be known for certain, leaving no room for comparison or generalisation, no avenue for normative debate, and thus has little practical relevance. The so-called ‘complex realist’ approach resonates with me because it questions the ontological extremes and consequent nihilism associated with such acute subjectivism, relativism and social constructivism.

Theoretically then, this thesis blends a realist position that accepts that the world exists separate from our consciousness of it, and thus can be measured and known, with a selective constructivist stance. Realism provides the theoretical validation for the use of cultural consensus analysis (see Chapter 4) as a method, through the conviction that it can actually measure and identify ‘something’. By way of qualification however, a complex realist approach does not mean that reality is taken to exist as solely **separate** from our actions (as is the case with brute positivism), but rather accepts the tenets of the social constructivist position to the extent that it recognises that the process of measurement, for example, is a social process which occurs in social contexts (Byrne 2002:15). It recognises that the researcher is an active agent of change. This thesis blends deconstructionism with cautious social constructivism and critical realist epistemologies in order to bridge the circular and nihilistic tendencies associated with acute postmodernist approaches.

## **Limitations**

All academic endeavours have limitations. A major shortcoming of this thesis is the amount of material I could not use because of imposed length restrictions. A detailed discussion of the pan-Melanesian construct of *kastom* and a more critical appraisal of the extensive literature surrounding customary marine tenure, for example, would have allowed for a more nuanced interpretation of my results. This would have also resulted in a broader appraisal of the resource management context of MPAs and allowed for additional recommendations.

## **Thesis Overview**

This first chapter has outlined my research questions and provided a rationale for my investigation of exploring the **processes** of conservation in the maritime context of Marovo Lagoon, Solomon Islands. I have discussed my research design and theoretical positioning, identifying the complex realist perspective and flagged intra-cultural factors as an important thematic thesis concern.

In Chapter Two, I provide an overview of the Solomon Islands, including environmental and economic details, before introducing Marovo Lagoon and the case studies on which this thesis is based - the villages of Chea and Bili and the NGO projects currently working to implement MPAs in their territories. These contextual considerations include socio-cultural particulars which are integral to later discussions.

Chapter Three examines the literature on MPAs, presenting an appraisal of the limitations and strengths of MPAs. In addition, I highlight a number of ‘factors of success’ or ‘indicators’ drawn from the literature which are considered necessary for MPAs to meet their objectives. Finally, I provide a brief discussion of customary marine tenure and its discursive and practical considerations in relation to MPAs, as this has considerable bearing on resource management issues.

Chapter Four describes methods and results. Here I provide details of the methods used during my fieldwork, including a discussion of sampling strategy and survey instruments, before presenting the results of my fieldwork. These are presented with a minimal commentary as the discussion chapter elaborates on these results in detail.

In Chapter Five, I draw all the literature and results together, using the conceptual categories of ‘problem’, ‘solution’ and ‘process’, to undertake a comprehensive discussion of the issues.

I bring into play the process orientated approach of Lemon and Seaton (1999) and Arce and Long's (2000) anthropological prism of 'counter-tendencies', to map and identify some of the 'unanticipated consequences' associated with these interventions, which have weakened and ultimately stalled the projects' conservation objectives. Engaging with these and other insights, in Chapter Six I draw conclusions about the potential of MPAs as a resource management tool in Marovo, offer some preliminary recommendations, and highlight avenues worthy of additional research.

## CHAPTER 2: THE CONTEXT(S)

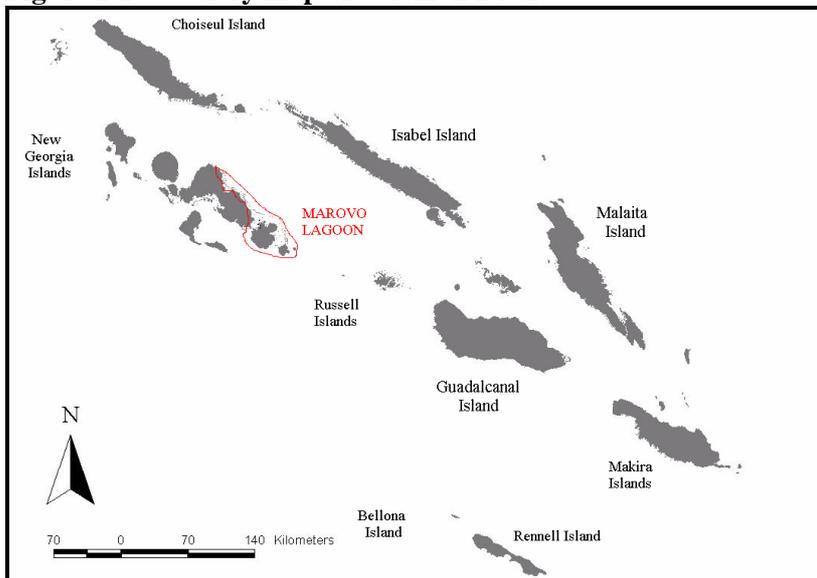
### INTRODUCTION

This chapter provides a contextual overview and introduces the case studies. It begins with a summary of the Solomon Islands' environmental, demographic, economic and socio-cultural contexts, including a brief discussion of the integral pan-Melanesian construct of 'wantok'. This is pertinent to later discussions regarding the impact that these factors have on conservation objectives such as MPAs. This is followed by an ethnographic overview of Marovo Lagoon, which introduces this study's case studies: the villages of Chea and Bili, and the two organisations currently working in these communities to establish MPAs.

### THE SOLOMON ISLANDS

The Solomon Islands consist of six major and approximately 990 smaller islands, forming a scattered archipelago of mountainous islands and low low-lying coral atolls in the southwest Pacific (Figure 2.1), about 1,900kms northeast of Australia. The climate is tropical and humid, with abundant rainfall supporting a rich environment that makes the Solomon Islands one of the ten most biologically diverse nations in the world (The Nature Conservancy 2005).

**Figure 2.1: Country map of Solomon Islands**



Source: Chris Roelfsema (CMS, University of Queensland)

Humans first entered the Pacific towards the end of the Pleistocene, about 40 000 years BP (Before Present) (Groube *et al.* 1986). Archaeological evidence suggests that parts of the Solomon Islands may have been settled by 28,000 BP (Loy 1992). The first documented

European contact was in 1568 by a Spanish explorer, but it was eventually the United Kingdom which established a protectorate over the Solomon Islands in the 1890s (Bennett 1987:104). Self-governance was achieved in 1976 followed by independence in 1978.

The most recent estimate of the country's population is approximately 500,000, with a growth rate of around 2.6% (National Statistics Office 2006). The majority of people (84%) live in rural areas in small, widely dispersed coastal settlements (SIG 2002:10). Solomon Islanders are a diverse mix of cultures, with over 80 different Indigenous languages and dialects spoken. English is the official language, but Solomon Islands Pijin is the national *lingua-franca* (SIG 1999:20). Christianity is ubiquitous throughout much of the nation, but displays varying degrees of syncretic tendencies. Approximately 85% of all land and marine areas in the Solomon Islands are held under 'customary' tenure systems, with fishing, trade and subsistence agriculture the primary source of food and livelihood for most of the population (Kinch *et al.* 2005b:15). Most people's protein intake is derived solely from seafood, and Solomon Islanders have one of the highest per capita seafood consumption rates in the world (Kile 2000:143; see also Earth Trends 2002 for statistics). This local dependence on natural resources is paralleled at the national economic level, which as demonstrated later, has significant social and ecological consequences.

### **A 'Natural' Economy**

Like all Pacific countries, the Solomon Islands is heavily dependent on aid and imports (Hughes 2003:20; see also National Statistics Office 2006). The government has relied almost entirely on natural resources, mainly fisheries and timber exports, to balance the country's trade deficit and provide economic growth. Marine resource exports (not including tuna) peaked in 1992 (Kile 2000:143, while logging exports peaked in 1996 (Central Bank of Solomon Islands 2000). Exports have been in decline ever since, signalling that these resources have surpassed their sustainable harvesting capacity. Nonetheless, dependence on resource rents has steadily increased, with round log exports accounting for 43.5% of the country's GDP in 1990, 56% in 1994 (Kabutaulaka 2000:91) and 68% in 2000 (Central Bank of Solomon Islands 2000). This trend is highly unsustainable with the harvest rate of 5,550,000 cubic meters in 2000 being nearly twice the estimated sustainable rate (Sheehan 2000:127). Corruption at all levels of the public and private sphere has always been considered rampant, but recent audit reports have quantified just how ubiquitous and destructive such practices have been (SIG 2005a, 2005b). Corruption and mismanagement, concomitant with a reliance on the 'western' economic model of natural resource rents and

foreign aid, has resulted in exchange rate appreciation, an unprofitable environment for agriculture and manufacturing investment and increasing ecological degradation. It is into this political and economic mire that conservation regimes must tread; a task further complicated by a number of integral socio-cultural factors; namely *kastom* and *wantok*

### ***Kastom and Wantok***

Although home to a diverse range of peoples, two pan-Melanesian polysemous concepts associated with the Pijin terms ‘*wantok*’ and ‘*kastom*’ criss-cross local ethnic and cultural boundaries. *Kastom* broadly refers to the shared ‘traditions’ and life-ways of a single language group, but in practice is a multivocal concept which has been the focus of considerable anthropological debate (e.g. Akin 2005; Babadzan 1998; Jolly 1992; Keesing 1982, 1993; Keesing and Tonkinson 1982). *Kastom* is not so-much a discourse itself, but rather it is **used by different** discourses (Seller 1996:22), and as such is a tool of what Jourdan (1995) refers to as ‘socio-cultural creolisation’. Further engagement with the realm of *kastom* is beyond the scope of this thesis, but the reader is directed to the above references for further information. The pertinent aspect of *kastom* relevant to this thesis is the fluid and selective manner in which it is used; a factor that has some bearing on customary marine tenure issues and resource management aspirations, but are not discussed here (see Hviding 1998). The ‘*wantok* system’ has more direct relevance to this thesis, as *wantokism* (see below) is identified as one of the ‘variables’ that has had significant impacts on resource management aspirations.

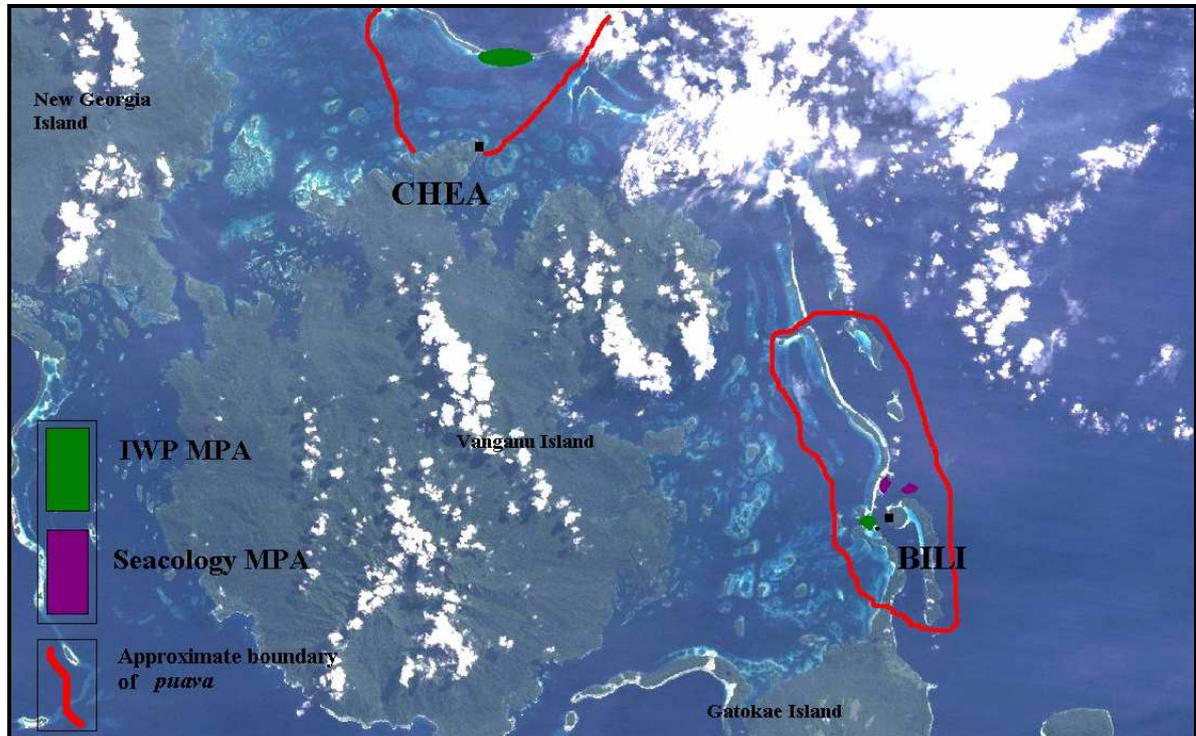
‘*Wantok*’ derives from ‘one talk’, meaning people from the same language group, but more specifically indicates people who are part of the same lineage or clan (Jourdan 2002:257). In temporal terms, *wantok* identity is a relatively new mode of social identification which grew out of situations where different language groups came together, such as in schools and plantations, and is most relevant today in Honiara (Kabutaulaka 1998:25). It loses much of its significance in the villages where everyone speaks the same language. As a social category the *wantok* system advocates cooperation and involves a series of obligations based on reciprocity: a phenomenon sometimes called *wantokism* (Kabutaulaka 1998). Honiara residents, for instance, are obliged to lodge, feed and often financially support visiting *wantok* from rural areas (Gooberman-Hill 1999; Jourdan 2002:257). As well as a prism through which national consciousness can be expressed, the *wantok* reference can also serve as a destabilising factor (Kabutaulaka 1998:25). Political alliances, the widespread instances of government corruption and the widespread failure of many small businesses to last more than

a few years is often explained via recourse to the collectivist, non-individualist and perceived ‘anti-capitalistic’ tendencies inherent in the reciprocity associated with *wantokism* (eg. Sol Air Magazine 2005). As noted above, in the villages *wantokism* is of less concern and people are more focused on immediate issues, such as meeting their livelihood needs. The next segment of this chapter introduces these local livelihood needs in the case study area and provides a necessary contextual overview for the micro socio-cultural ‘variables’ that are integral to understanding resource management interventions such as MPAs.

## MAROVO LAGOON

Marovo Lagoon, situated in the Western Province of the Solomon Islands (Figure 2.2), is considered the longest and best defined double-barrier enclosed lagoon in the world, with a total lagoon shelf of about 700km<sup>2</sup> (Stoddart 1969). Approximately 12,000 people reside in over 70 villages (Kinch *et al.* 2005b:17) speaking five languages - Marovo, Vangunu, Bareke, Hoava and Kusaghe - forming a cultural complex termed ‘Marovo’ by both themselves and others (Hviding 1996a:40).

**Figure 2.2: South-eastern portion of Marovo Lagoon, showing villages, territory and MPAs**



Source: Photo - CMS, University of Queensland; MPA locations, *puava* boundaries etc. - author

### **Historical Interlude: From Exchange to Extraction**

In Marovo, there was (and still is) an important dichotomy between ‘people of the coast’ (*tinoni pa sera*) and ‘people of the bush’ (*tinoni pa goanna*) (Hviding 1996a:chpt.3). Up until the end of the 19<sup>th</sup> century Marovo-speaking ‘coastal people’, based mainly on Marovo Island, Bili Passage and Gatokae, operated large-scale inter-island systems of warfare and trade based on headhunting and prestige-goods exchange (Hviding 1996a). Headhunting raids were instigated on regular ritual cycles that required *mana* (a pan Oceanic term referring to power and efficaciousness) to appease ancestral and other spirits (Hviding 1996a).

Whereas ‘coastal people’ were dependent on marine resources for food security, ‘bush people’ were agriculturists and focused their attention on intensive irrigated taro cultivation in the river valleys and mountain craters of New Georgia and Vangunu. Exchange between these two groups in the form of fish – taro barter was frequent, as was selective exogamous marriages to help solidify intra-group alliances (Hviding and Bayliss-Smith 2000).

It was not until the 1780s that a number of European vessels came into close proximity with the New Georgia group and made ‘contact’ with locals (Jackson 1978 *in* Hviding 1996a:103). Over the subsequent decades, traders began to frequent the lagoon, trading iron axes and other goods in exchange for turtle shell and *bêche-de-mer* (Bennett 1987:49; McKinnon 1975). By the close of the 19<sup>th</sup> century a complex combination of Indigenous and externally-imposed ‘pacification’ occurred, followed by a breakdown of the previously robust coastal polities (Hviding 1996a:98). In the 1880s, a population movement called the *horevura* (literally ‘descend and emerge’) begun as bush groups moved from the forest to resettle on the coast, leading to a dissolution of the fish/taro barter system and the development of a less rigid scheme of agriculture and fishing (Hviding 1996a:115). Methodists and the Seventh Day Adventist missionaries arrived during 1912-1915 (Hviding 1996a:117).

Currently, bush and coastal peoples are settled throughout the lagoon in villages and hamlets along the coast and the inland forests are empty of people, save for the odd logging camp and bush gardens. However, while people live virtually identical lives regardless of their heritage, group identity is still expressed in terms of this bush/coast dichotomy and is intricately tied to political control of customary territory (*puava*) (Hviding 1996a:chp.3; Hviding and Bayliss-Smith 2000:34-43). In light of the increasing intensity of both external and internal forces and changes, what Hviding calls ‘compressed globalisation’ (2003:543), this sphere of ‘bush/coastal’ identity is both celebrated and increasingly contested, with people selectively emphasising their ‘bush side’ or ‘coast side’ and amplifying lineage connections (*soto*) to suit their present circumstances and aspirations (Morgan Jimmuru, Marovo local, *pers. comm.*

2005). This fluid and selective practice is in continuity with the generic tone of *kastom* noted earlier. In one of the villages in which this research is based, examples of such contested ‘fluidity’ has emerged as one of the major destabilising factors in terms of intra-village conflict (see below). Subsequently, this ‘variable’ has had significant implications for resource management aspirations, with respondents in this village looking to outside agents to assist or lead conservation programs (see Chapter 5).

Today, in place of the traders and missionaries of the past, the people of Marovo deal with the agents of numerous foreign companies and conservation NGOs conducting assorted ‘projects of desire’ (Hviding 2003) - such as WWF, Greenpeace, Seacology, IWP and the UQ-Marovo Project. Under the discourse of ‘alternative development’ these NGOs proffer eco-tourism, aquaculture and paper-making as the economic panacea to people’s future (see below). While logging is the most noticeable commercial activity, other extractive activities that impact upon the lagoon include bait-fishing and the live reef fish food trade (LRFFT) (Agassi nd.; Donnelly 2001). Perhaps the most puzzling and controversial ‘development’ to date is the Malaysian owned Sylvania Oil Palm Plantation situated on 10,299 hectares of once forested land on the island of Vanganu. This ‘development’ was supposed to bring jobs, electricity and a small metropolis to the island, but to date only 600 hectares has been planted, no processing mill has yet been built and it appears that the company’s primary objective is logging and the oil palm project was a pretext to lure privileges from the government and to solidify its logging operation (Riemana 2003:8). If oil palm is extensively planted, it is believed that the runoff into the lagoon system from fertilisers and pesticides will have an acute negative impact on parts of the lagoon’s ecosystem (Simon Albert, marine researcher *pers. comm.* 2006)

These historical and socio-cultural factors, combined with the increasing developmental aspirations of both internal and external agents, have had resounding impacts. Ecologically, these noted resource extractive activities highlight the variety and complexity of anthropogenic impacts underway in the lagoon; locally induced ‘overfishing’ is just one of many links in the resource extraction chain. Socio-culturally, these same developments have had acute repercussions, including increased fiscal responsibilities and changing livelihood strategies, as elaborated below.

### **Social Organisation**

Marovo Lagoon is composed of around 24 named *butubutu*, 10 of which are considered ‘bush’ groups and 7 ‘salt-water’ peoples (Hviding 1991). *Butubutu* is a kin-based group

composed of consanguineal relatives who claim and control territories of land and sea (*puava*) (Hviding 1989:13). The basis of a *butubutu* is cognatic descent with varying degrees of patrilineal and matrilineal biases allowing for significant social flexibility (Hviding 1996a:132-3,136). There is a distinction between having ‘power’ or ‘ownership rights’ (*nginira*) and having ‘use rights’, with ideally only the resident core of the *butubutu* having *nginira* rights (Hviding 1989:13)

Each *butubutu*’s affairs are managed by a senior male leader, the chief or *bangara*. The chiefly system in Marovo is not congruent with the ‘big man’ system extant throughout much of Melanesia, with the position of *bangara* being largely hereditary (Hviding 1996a:88). A *bangara* is assisted in his duties by a number of associates or *palabatu* (important men) chosen from a core group of people with ‘strong’ descent (many filiative links to chiefly genealogy) (Hviding and Bayliss-Smith 2000:39). The majority of *bangaras* today reside in Honiara, and it is the *palabatus* who are responsible for day to day village affairs. There is also a decreasing level of respect for chiefly office, due to a range of factors. This breakdown in local political authority provides both challengers and opportunities for conservation aspirations (see Chapter 5).

Contemporary socio-cultural variation in Marovo is generally described in relation to Christian denominational membership (Hviding, 1996a:51; Juvick 1993). Close to 60% of the lagoon’s total population belong to the Seventh Day Adventist Church (SDA), with the remainder being predominantly United Church (Methodist) and two villages in northern Marovo identifying as Christian Fellowship Church (CFC) communities (Juvick 1993). Each village adheres to one denomination only, but ‘traditional’ alliances still cross-cut religious affiliation (Hviding 1996a:51) as evidenced in the fact that the Holy Mama (the spiritual authority of the CFC) provided the paint for the SDA church in Bili (Johnson Poghoso, Bili Chief, *pers. comm.* 2005). The Church is the major focus of community organisation and provides much of the ‘rhythm’ of village life. However, younger people are increasingly moving away from the Church - predominantly male youth who chew betel-nut and /or smoke tobacco – and these people are referred to as ‘backsliders’. It is this group who harvest *bêche-de-mer*, which along with crustaceans and pork are considered ‘unclean’ in SDA doctrine.

### **Livelihood**

People in Marovo rely on both subsistence and income generating strategies to meet their livelihood needs. There is significant gender differentiation in work patterns and type, with men predominantly fishing and carving and women mainly gardening and being responsible

for domestic tasks. Nonetheless, as Hviding (1996a) stresses, there is also much flexibility between these domains (1996a:157). This fluidity is particularly relevant today in relation to fishing, with numerous people commentating that women and children fish in a manner and frequency not permitted in the past (Love and Ross 2006). Interestingly, several reports have found that increased male involvement in the cash economy, whether it be carving, eco-lodges or the LRFFT, significantly increases women's workload (Oliver and Greenpeace Pacific 2001:13; Donnelly 2001:10).

While SDA communities are more individualistic and considered more 'monetised' than both United Church and CFC communities (Juvick 1993; Bayliss-Smith 1993), the household is still the primary focus of local production. Like Pacific economies generally, the Marovo economy is of a 'hybrid' nature (Rodnam 1987) with people deriving their incomes from numerous opportune and ever dynamic sources. In the SDA communities where I was based, most households derived a significant portion of their income from wood carving and handicraft production, followed by marine resource exploitation and the sale of garden produce. In Bili some families also received royalties from bait-fishing and tourism operations (Donnelly 2001:10-12; Kinch *et al.* 2005b:30; Love and Ross 2006).

The most economically important marine resources in Marovo are reef fish and, until recently, bêche-de-mer harvesting, followed by the sale of trochus and other shellfish (Love and Ross 2006:16-18). Small-scale commercial reef fishing has been a feature of the lagoon since the 1980s when more than 25 fishery centres were established by numerous external agencies to stimulate commercial fishing in the region (Donnelly 2001:7; Kinch *et al.* 2005b:38-39). Today, most of these projects have ceased to operate. Nonetheless, reef fishing has continued, with local 'esky owners' or intermediary 'esky handlers' buying fish from local fishers, which are subsequently stored in insulated boxes on ice and transported on the weekly inter-island boat to the municipal market in Honiara (Love and Ross 2006:17).

Integration into the cash economy is escalating and people are more reliant on cash than ever before. In terms of expenses, school fees in SDA communities are the highest in the region (Donnelly 2001:40) and SDA devotees are obliged to pay a tithe to the Church of one-tenth of all their cash income, garden produce and fish catch. There is increasing household reliance on tinned fish, fuel, tobacco and importantly rice, which along with sweet potato and cassava has replaced taro as the main dietary staple (Bayliss-Smith 1993; Hviding and Bayliss-Smith 2000:180). These combined expenses constitute a significant financial challenge in the absence of waged work, and puts increasing pressure on natural resources as the only

available source of income. This obviously impacts upon any resource management strategy that is contingent upon restricting fishing effort/access, such as MPAs.

The final section of this chapter introduces the specific case studies. First, the two villages in which the fieldwork was undertaken are presented, including pertinent historical and socio-cultural particulars. Second, the project case studies are introduced, and a record of their objectives and overall approach provided.

### CHEA VILLAGE

Chea is one of three villages located on Patu Laiti (Marovo Island), in the central portion of the lagoon. Established in 1958 on the site of a pre-Christian ceremonial ground, the village is the primary settlement of the *butubutu* Babata (Liligeto 2005). Figure 2.2 provides an approximate representation of the Babata *puava*, which is also shared by the neighbouring communities of Chubikopi (*butubutu* Kalekogu) and Sasaghena (*butubutu* Olovotu).

According to the recent IWP survey (Kinch *et al.* 2005b), 85% of marine resource extraction in the Babata *puava* are harvested by the Chea community, 10% by other 'traditional' right users (people from other *butubutu* and villages who retain use-rights) and 5% by outsiders (2005b:53).

The **centrality** of Marovo Island is more than just geographic - it is also figurative in that the island is widely considered the basis of Marovo language and customs (Hviding 1996a:xx). It is prominently featured in many *vivinei tuari* (stories of old) (see below), and the Babata *butubutu*, as the chiefly patrilineal line of Marovo Island, are connected through lineage connections with numerous other clans and sub-clans and thus many subsequent *butubutu* throughout the lagoon (Liligeto 2005). Population estimates for Chea are difficult to ascertain as conflicting reports exist (i.e. LaFranchi and Greenpeace Pacific 1999; Hviding 1996a). Nonetheless, I estimate the current population level to be around 300-450 people (including children).

The Chea community was officially incorporated in 1983 and has been actively involved in various Marovo wide initiatives, such as the Marovo Area Council and the (now defunct) Marovo Lagoon Resource Project. Chea is one of the few villages in Marovo with a community constitution (established in 1991) and a *Resource Management Plan* (Chea Village Community 1991a, 1991b, 2003b). It has also recently established its own NGO, *Minbolt*. The community prides itself on producing numerous persons of local import, including the prominent pioneer missionary Barnabas Pana, who translated the Bible into

Marovo, and the important chiefs, Kata Rogoso Senior (d.1964) and Kata Rogoso Junior (d. 1997) who were also prominent missionaries. The current chief, Herrick Rogoso, is the twelfth chief of Babata (Liligeto 2005).

The history of Chea has thus given it a reputation of being a ‘strong’ community and a beacon of Marovo *kastom*. Relative to other communities this is certainly deserved (see below). However, it is important not to (re)present the Chea community uncritically as a homogenous and ‘faultless’ entity; like any community there is also dissensions and problems. For example, during my stay some segments of the community (mainly male youth but not all ‘backsliders’) expressed frustration and anger towards the educated and wealthy elites and those with close *wantok* ties to the chief or his *palabatu*, arguing that their voices and concerns were not heard. A recent village review also assessed that the Elders Committee was not functioning properly; there were some misuses of community assets; the village committee did not know their functions and there was a general inability to cope with the changes brought by development (Chea Village Community 2003b).

A window into intra-village issues is presented here primarily because it is such historical and socio-cultural factors that are integral to wider resource management issues. The inter-community differences between Chea and Bili are identified as significant ‘variables’ in relation to why each community had different preferred resource management options later in the thesis (see Chapter 5).

### **BILI PASSAGE VILLAGE**

The other village case study is Bili village. Also referred to as Bili Passage village, it is situated on Minjana Island, a barrier island adjacent to the northern tip of Gatokae at the eastern end of Marovo Lagoon (Figure 2.2). The majority of people residing in Bili belong to, or have married into, the Getu *butubutu*, which is one of four major *butubutus* on Gatokae. All barrier reef passages are significant in Marovo as they are the gateways to the inner lagoon and are ‘traditionally’ associated with and guarded by shark spirits (Hviding 1996a:242; Kupianen 2000:33). There is a particularly strong connection between the coastal *butubutus* of Chea, Repi and Bili, based upon their common ancestral connections (*chubina*). These are recounted in numerous *vivinei tuari* (stories of old), including one such story about the massacre of Bili Passage people around 1850 (Hviding 1996a:110). This well known story traces the deeds and travels of a few of the survivors – the chief’s son, Getu (also called Liliti), and his daughter Koleki - and how Getu finally returned from Isabella, via Chea, to

Bili (Raeboe Logara, Bili chief, *pers. comm.* 2005; see also Agassi nd: 5-6; Hviding 1996a:239; Liligeto 2005:74-5). All of Bili's *bangaras* are descendents of Getu, the *inatungu* (apical ancestor) of the Getu *butubutu*.

Bili village was originally located at Govara kiso, on the other side of the island, but moved after the SDA church established a mission on the current location in 1916 (Agassi nd:2). Over the last ten years the population has grown from 179 people residing in 31 households, to an estimated 300 people (Kinch *et al.* 2005b:18), with some families leaving the village proper to establish hamlets on adjacent islands (such as Voruvorusu, Tibara and Tungupaga). The Bili village *puava* extends along the marine rich *toba* (barrier islands), and is less 'robust' than Chea's in terms of interloping, with an estimated 65% of marine resources harvested by people from *butubutu* Getu, 15% by other traditional rights users and a significant 20% by outsiders (Kinch *et al.* 2005b:53).

Bili village has a rudimentary community infrastructure. The dilapidated primary school is currently being replaced by a new school building funded by Seacology (see below), and a previous provincially funded health clinic was closed due to vandalism. Bili had a local reservoir and several community standpipes built and installed by the Adventist Development Relief Agency (ADRA) in 2000, but people now have to rely on water tanks as the pipes and pump were recently vandalised (Kinch *et al.* 2005b:25). The *butubutu* is in the unusual situation of having three chiefs - Raeboe Logara, Luten Hilakolo and Johnson Poghoso. There is considerable contention and social fracture in the community over several issues including matters associated with the distribution of royalty monies from bait-fishing and diving/tourism access fees. Based on 1998 catch rates from bait-fishing, it is estimated that royalties totalling approximately SI\$170,000 (approx. AUD\$30,000) a year have been paid to the chiefs, most of which has been used for personal expenses (Agassi, nd:16).

This intra-community 'tension' has been further exacerbated by recent logging activities. A educated and well connected individual who claims to have the appropriate *nginira* birth rights to speak about land issues has invited a logging company into the Getu *puava* to extract timber. However, many segments of the community dispute this person's lineage claims. This has had a significant destabilising effect in the community, pitting family against family as people take different sides (*kale*). These localised complexities are just some of the numerous conditions which invariably impact on resource management initiatives, as demonstrated in subsequent chapters.

Several resource focused NGOs are currently working in both Bili and Chea's territorial. The International Waters Project (IWP) has a MPA in both communities, an American based NGO, Seacology, has established another two MPAs in Bili, and the University of Queensland is working in both communities as part of their research in establishing an ecological baseline of the lagoon's ecosystem health. Figure 2.3 provides an overview of these projects, based on their own literature, which is referred to later in order to analyse individual projects conceptual framework.

## NGO CONSERVATION PROJECTS

The International Waters Project (IWP) in the Solomon Islands is part of the Strategic Action Programme for the International Waters of the Pacific Small Island Developing States. It is funded by the Global Environment Facility (GEF) and executed by the Secretariat of the Pacific Regional Environment Programme (SPREP). In the Solomon Islands, the project is focusing on promoting sustainable fisheries by establishing marine protected areas (MPAs) (Kinch *et al.* 2005b:8).

Seacology is a non-profit environmental organisation whose mission is to preserve '...the highly endangered biodiversity of islands throughout the world' by exchanging 'tangible benefits' in the form of 'development' for areas of marine or forest protection ([www.Seacology.org](http://www.Seacology.org)). In Bili, Seacology is providing funds for the construction of a new primary school building in exchange for a community covenant to protect 21 acres of marine reserve (MPA) and a 12 acre uninhabited island. One MPA is a breeding ground for *Panjara* (Coral trout), the other is a scuba diving destination frequented by MV Bilikiki Cruises, who have agreed to monitor the reserves ([www.Seacology.org](http://www.Seacology.org)).

The UQ-Marovo Project (2004-2007) is led by the Centre for Marine Studies, University of Queensland and is supported by the MacArthur Foundation. The project's broad goal is to '...provide an integrated approach to the environmental management of Marovo Lagoon', and conduct a baseline study of the lagoons ecosystem (Centre for Marine Studies 2003:3).

## SUMMARY

This chapter provided an overview of the macro-country and micro-local context(s) of marine resource management, and introduced the case studies. The next chapter continues the contextual discussion by providing a detailed and critical look at the primary issues with which this thesis is concerned – marine degradation, fisheries management and MPAs.

**Figure 2.3: NGO Project Overview**

	<b>IWP</b>	<b>SEACOLOGY</b>	<b>UQ PROJECT</b>
<b>PROBLEM(S)</b>	<p><b>Inadequate [Local &amp; National] Resource Management</b> (Coastal &amp; Marine)</p> <p>Unsustainable coastal fisheries</p>	<p><b>Endangered Biodiversity</b> (Island and Marine)</p> <p>Plant and animal extinction</p>	<p><b>Endangered Biodiversity</b> (Marine)</p> <p>Reduction in ecosystem function &amp; productivity</p>
<b>CAUSE(S)</b>	<p><b>Depletion of Marine Resources</b></p> <p>Uncontrolled over-harvesting (emphasis on bêche-de-mer) Destructive fishing methods</p> <p><b>Coastal Erosion</b></p> <p>Uncontrolled mangrove clearing Rising sea levels</p> <p><b>Marine Pollution</b></p> <p>Oil/fuel discharge Lack of sanitation Logging Over-harvesting of filter feeders</p>	<p><b>Economic Development</b></p> <p>‘Indigenous people...[face a]... dilemma of choosing between protecting their precious natural resources, and economic development’</p>	<p><b>Anthropogenic Impacts (Intentional &amp; unintentional)</b></p> <p>Destructive fishing practices Point source pollutant release Non-point source pollutant release Run-off due to land clearing Unsustainable use of resources</p>
<b>SOLUTION(S)</b>	<p><b>Establish Pilot Projects to help design &amp; implement solutions at local &amp; national level</b></p> <p>Identify root causes of environmental problems Collect baseline data on social, economic and environmental factors governing resource use Identify low cost solutions Strengthen resource management at the national level Establish Marine Protected Area</p>	<p><b>Protect Biodiversity through Development Incentive</b></p> <p>Seacology searches for a ‘win-win’ situation by giving local people some ‘tangible benefit’ for protecting their natural resources</p>	<p><b>Support better Management through targeted scientific research</b></p> <p>‘...provide an integrated approach to the environmental management of Marovo Lagoon...’</p> <p>Gather local perspectives of problem &amp; solution Collect data on utilisation of lagoon resources Ecosystem assessment Map part of lagoon</p>
<b>OBJECTIVES</b>			
<b>PROJECT APPROACH</b>	<p>Community Participation Resource Economics Strategic Communication Monitoring &amp; Evaluation Institutional Strengthening</p>	<p>Establish conservation covenants over areas of land or sea Minimum red tape and bureaucracy</p>	<p>Multi-disciplinary Consultative (rather than participatory) Research intensive</p>
<b>PRIMARY SOLUTION</b>	<p><b>Marine Protected Area’s (MPAs)</b></p> <p>Promote increased community involvement &amp; responsibility for resource management Contribute to sustainable fisheries</p>	<p><b>Implement Protected Area’s (Marine &amp; Island)</b></p> <p>Protects diversity Community receives ‘development’ benefit</p>	<p><b>Scientific information informs policy and management decisions</b></p> <p>Provides impetus and scientific rationale for other projects</p>

Sources: **IWP** – Kinch *et al.* 2005a, IWP nd; **Seacology** – Seacology Annual Report 2005, Seacology 2006; **UQ Project** – University of Queensland 2003; CMS 2006.

## CHAPTER 3: THE ISSUE(S)

### INTRODUCTION

This chapter introduces the primary issues that are the focus of this thesis: the ‘problem’ of marine degradation and the ‘solution’ of ‘marine protected areas (MPAs). Tracing the identification of the ‘problem’ and the emergence of the ‘solution’ provides an insight into conservation epistemologies and some of the scientific background information necessary to make informed evaluations about the applicability of MPAs. Critically reviewing the MPA literature I ask the following questions: What are the benefits of MPAs? What factors have been identified as linked to MPA successes and failures? What impact does customary marine tenure (CMT) have on MPA implementation? Addressing these and other queries builds the contextual framework on which to undertake a preliminary assessment of the case studies in Chapter 4, and secure my arguments for Chapter 5 concerning the *a priori*, essentialist and assumptive homogeneity of some projectised approaches.

### THE PROBLEM

[n.] *Situation...that needs attention and needs to be dealt with or solved*  
(Cambridge Dictionary Online)

#### Marine Degradation

Around the world there is increasing awareness that marine resources and habitats are in critical decline. The single most cited cause of such marine degradation is overfishing (Jackson *et al.* 2001; Pauly and Watson 2005). Globally, 25% of fish<sup>2</sup> stocks are estimated to be over-exploited, 50% fully exploited and 9% ‘depleted’ (The World Bank 2004) Although high-seas or ‘open-sea fishing’ is a major contributor to fishery depletion, this thesis is concerned specifically with in-shore, coastal fisheries. In the Solomon Islands’ context, examples of over-exploited coastal marine species include: trochus, bêche-de-mer, green-snails, giant clams, crayfish/lobster, turtles (mainly hawksbill) and several species of reef fish (Kile 2000). Over-fishing has been so

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<sup>2</sup> The term ‘fish’ and ‘fishery’ is used throughout this thesis to refer to any marine organism that is exploited, whether it is a fish, mollusc, crustacean, etc.

extensive in some areas, such as Lau Lagoon in north Malaita, that the area is devoid of people's preferred edible species (Ramohia *et al.* 1999 in Sulu *et al.* 2000:16).

Technically, over-fishing results in the disproportionate extraction of breeding adults from a fishery 'system', undermining a given population's capacity to replace itself. Overfishing affects not just fish abundance but can also change and greatly degrade wider marine eco-systems (Jennings and Kaiser 1998). Commercial/industrial fishing is a major contributor to over fishing in some countries of the Pacific (namely Nauru and Tonga), but in the Solomon Islands' context it is local 'subsistence' fishing that is said to account for most (approximately 90%) of all coastal fishery extraction (UNEP 2005:3). However, as Dalzell and Schug (2002:9) note, such statistics should come with a precautionary caveat as it is notoriously difficult to separate domestic fisheries into 'commercial' and 'subsistence' components (see also Chapter 5).

Relative to Fiji and Vanuatu, Solomon Islands reefs and marine resources are considered amongst the healthiest in the region (Simon Albert, *pers. comm.* 2005). However, the future outlook is not overly positive. Recent episodes of coral bleaching, growing COTS (crown of thorns star fish) outbreaks, extensive mangrove clearing, coral mining and increased sewage outfalls are just some of the environmental cumulative impacts in **addition** to overfishing (Lovell *et al.* 2004:345). In Marovo Lagoon, where extensive logging and the oil palm plantation are situated, deforestation is further contributing to water turbidity and increased macro-algal blooms as a result of acute sediment dispersal and re-suspension (Foale 2000; Lovell *et al.* 2004: 345; Read and Moseby 1999). Whether it is 'overfishing' or land based anthropogenic activities, the ability of the nation's government to engage adequately with, let alone manage such issues, is extremely low.

### **Fisheries Management Issues**

Melanesian states such as the Solomon Islands are characterised as 'weak' (Foale and Menele 2003:1) because, among other things, the modern nation-state apparatus is an outside model grafted onto a multiplicity of Indigenous social and political structures (Fraenkel 2004:9). This graft has never quite 'taken', with corruption and ineffective bureaucracy a ubiquitous hall-mark of government. This drastically reduces the ability of government departments such as national fisheries to do their job, as foreign-owned fishing companies are provided easy access to state owned resources (e.g. tuna) through bribing relevant politicians and bureaucrats (Foale and Manele 2003:1; SIG 2005a). As elsewhere in the Pacific, coastal fisheries are customary controlled, further complicating matters from a centralised intervention perspective. In such

contexts, national fishery departments are generally relegated to ‘crisis management’ roles, able only to watch and react to the ‘boom and bust’ cycles of export commodities rather than actually ‘managing’ resources *per se* (Adams 1996 in Dalzell and Schug 2002:11).

Such government deficiencies, combined with an increasing awareness of the detailed and empirically based knowledge of local fishers and the effectiveness of customary regimes to govern access to marine resources, has contributed in advancing support for the development of community-based management systems throughout the Pacific (Hviding and Baines 1992; Johannes 1994). Such calls vary in detail, with a continuum ranging from an almost complete ‘bottom-up’ approach with no or little outside involvement at one extreme, through to collaborative partnerships with local NGOs and/or national fishery departments in the middle, all the way to more externally directed, ‘western’ funded ‘conservation programs’ at the other end of the spectrum. The thematic thread linking these approaches is the discursive catch-call of community management. However, as the continuum implication suggests, in practice the extent of local control and actual community support varies significantly. As elaborated upon below, there is considerable debate about the applicability of such approaches overall, as well as disagreement about which management and conservationist ‘tools’ are most relevant. One of the most widely utilised tools, in evidence across the whole spectrum of approaches but subsumed under various labels, is ‘marine protected areas’ (MPAs).

## **THE SOLUTION**

[v.] *To find an answer to a problem*  
(Cambridge Dictionary Online)

### **Marine Protected Areas: A Brief History**

In the industrialised ‘western’ world, the vastness of the oceans and the sheer diversity and volume of marine resources were once thought to be so prevalent that no management regime was necessary (Gravestock 2002:7). However, by the turn of the twentieth century concerns about decreasing fish stocks were beginning to be raised and, in the 1890s, parts of Britain’s territorial waters began to be periodically closed (Roberts *et al.* 2005:129). The first ‘official’ MPA is said to have been established at Glacier Bay, Alaska in 1925 (Jones 2002:198; but c/f. Ray 1999).

Ray (2004) traces the development of the 'modern era' of MPAs as beginning in the early 1960s and intensifying in parallel with the growth of NGOs throughout the 1960s-1980s before the awakening of the scientific community to 'conservation science' resulted in concerted scientific interest from the mid 1980s onwards (2004:210). A 1985 world wide review of MPAs listed 430, a figure which had grown to 1306 by 1995 (Agardy *et al.* 2003: 354). Interest from NGOs, the scientific community and Governments has continued to intensify. Today there are an estimated 400 MPAs in the Philippines alone (*MPA News* 7(10) 2006), and numerous governments have recently committed to building representative networks of marine and coastal protected areas that will constitute 20% of their territory by 2012 (IUCN 2003). MPAs have become the primary marine conservation tool of choice.

### **Definitions and Classification**

MPAs are (or were) considered a new paradigm in 'western' fishery management practices in that they signalled a fundamental shift away from a focus on single species management towards the more holistic approach of managing an entire ecosystem (Barr and Thornton 1997 *in* Gravestock 2002:8). The generic objective of all MPAs is to conserve the environment within its boundaries, but in practice there is a diverse array of MPA goals so that 'marine protected area' is more correctly an umbrella term rather than a single specific management approach (Agardy *et al.* 2003:356). No universally accepted MPA classificatory system exists. Some 'typologies' refer to MPA objectives only (Jones 1994), while others focus on utility and size (Agardy 1997 *in* Gravestock 2002:22). The LMMA network, a Fijian marine conservation initiative (see Aalbersberg *et al.* 2005), speaks of three main management strategies, or 'tools', that usefully sum up most approaches: full reserve, species specific refugia; and effort or behavioural restrictions (LMMA Network 2006). An elaboration of these strategies, cross referenced with the general classificatory labels of 'no-take', 'multiple-use' and 'zone' or 'network system', is presented as Table 3.1.

MPAs are not necessarily designated as 'no-take zones' (NTZ) or 'multiple-use' (MUMPA) areas only - although they often are. In an increasing number of contexts, these two approaches are used as a complementary group of strategies under an overarching 'zoning' schema, with different areas within a single territory being allocated different management strategies (eg. LMMA Network 2006). In this thesis, I use the term 'MPA' in its widest, generic sense, to refer

to both NTZs and MUMPAs, as well as any combination of these so that management schemes like LMMAs also come under the rubric of ‘MPA’ in my usage.

**Table 3.1: MPA Classification and management strategies**

Management Strategy	Details	General Classification
Full reserve	Sanction against all fishing activities (may or may not allow ‘recreation’ activities such as diving)	No-take MPA (NTZ)
Species specific refugia	Restrictions on harvesting specific species or certain sizes of species	Multiple-use MPA (MUMPA)
Effort or behavioural restrictions (incl. temporal)	Select sanctions regarding harvesting effort (i.e. catch quotas), and/or temporal proscriptions such as ‘rotating’ sanctuaries where selected species or certain sizes of a species in a given area are ‘open’ to harvesting only at a specific time	
Combination of approaches	Combination of all or some of the above	Zone or network system

### **No-take versus Multiple-use MPAs: Ideological Divides?**

Inherent in the general classifications of NTZs or MUMPAs are divergent philosophical assumptions that can be categorised as either predominantly ‘preservationist’ or ‘utilitarian’ perspectives (Jones 1994, 2005). While these philosophies are not necessarily incompatible and exist along a continuum, one perspective tends to dominate, with preservationists favouring NTZs and utilitarians preferring MUMPAs (Jones 2005:147, see also Callicot 1991). The preservationist approach takes an eco-centric perspective which emphasises biodiversity and the intrinsic value of nature (Roberts and Hawkins 2000), while utilitarians promote conservation in terms of its utility: its ability to restock harvestable species in order to enable their future sustainable use (Agardy *et al.* 2003; Jones 2005). These philosophical and pragmatic differences are perceived by some as constituting a significant ideological ‘divide’. Agardy *et al.* (2003) argue that many scientists, organisations and governments reify NTZs as the only legitimate form of MPA and are ignoring MUMPAs, and these authors are concerned that such selective advocacy can unrealistically raise expectations and put cynics on guard, potentially harming the long term viability of MPAs as a management option (Agardy *et al.* 2003). While the authors over-inflate the extent of this ‘ideological divide’ (Ray 2004), there is nevertheless ample evidence of such a division (Kaiser 2004; see also Jones 2005), and I return to this critique in my thesis conclusion.

## **MPA Objectives**

The primary objective of all MPAs is to conserve the environment within its boundaries. However, there are a range of additional objectives and rationales regularly cited in the literature as ‘secondary’ benefits. In a review of 30 papers, Boersma and Parrish (1999) report that additional reasons for establishing MPAs include: the maintenance of biodiversity (67%); promoting or controlling tourism (67%); and enhancing fisheries (53%) (1999: 290-1). In many tropical ‘developing’ countries, tourism is especially championed as the alternative economic ‘solution’ able to fill any fiscal gap left from the implementation of NTZs (Polunin 2002; Roberts and Hawkins 2000:87). This catchcry is making its way into Marovo. The UQ-Project is specifically intent on exploring eco-tourism options (University of Queensland 2003), and a recent IUCN meeting held in Marovo to (again) discuss the potential World Heritage Status of the lagoon suggest that tourism could once again be used as an incentive (Tabbasum and Dingwall 2005; c/f. Hviding and Bayliss-Smith 2000: chpt. 11). This economic dimension of MPAs is part of a wider strategy aimed at promoting a win-win scenario that benefits both marine biodiversity and fisheries objectives, ideally reducing local objections from fishers who would otherwise see MPAs as purely a biodiversity conservation initiative (Jones 2005:146). I return to this issue in my discussion.

## **MPAs in Theory and Practice**

Numerous studies and reviews concerning the effectiveness of MPAs have been conducted, but the ability of MPAs to meet their conservation objectives continues to be the subject of debate (Russ and Alcala 2003:625). Most commentators state that when effectively protected, the majority of species do display increases in abundance, biomass and/or mean size; but there is disagreement about the details (see below). In a survey of 80 NTZs, Halpern and Warner (2002) claim that significant increases in average fish density, biomass, and diversity occur within 1-3 years (2002; see also Gell and Roberts 2003). However, Russ and Alcala (2003) question the methods used by the authors and present data that demonstrate that recovery of large predatory reef fish can take between 15 and 40 years (2003:626). While not dismissing MPAs as a management tool altogether, Polunin (2002) also questions the optimistic claims of many, concluding that the fisheries benefits of MPAs in coral reef contexts are still unknown (2002). Nonetheless, although the **details** of the benefits of MPAs continue to be the subject of debate, MPAs have some potential conservation benefits. However, what are their limitations?

## **The Limitations of MPAs**

Even if fully effective (protected) over the long-term, MPAs have numerous limitations. Marine ecosystems are more complex and display more ecological connectivity than their terrestrial counterparts, and thus the efficacy of an MPA is heavily contingent on the state of the environment **outside its borders**, with numerous harmful activities having the potential to impact negatively on the overall health of MPAs (Jones 2002:199). Cognisant of these limitations, many commentators advocate that MPAs should exist only within the context of an integrated coastal zone management (ICZM) plan (eg. ISRS 2004; Jones 1994; 2002; Kelleher *et al.* 1995; Roberts *et al.* 2005). An adjunct to this approach is the idea that MPAs should not be stand alone units but rather exist as part of a broader network of MPAs (Gravestock 2002:11). This approach is easier to facilitate than the ICZM paradigm, and is gaining widespread currency (IUCN 2003).

Many commentators also argue that the biological success of an MPA is limited by its size, and fisheries' benefits will only accrue if large portions of fishing grounds (20-30%) are set aside as NTZs (Lunberg and Jonzén 1999; Sladek-Nowlis and Roberts 1999). However, the type of species being targeted for conservation is an important factor here, as some tropical fish travel large distances (eg. coral trout) while others have 'high site fidelity' (eg. trochus, bêche-de-mer) and spend their entire life, or an important part of their life history, inside a relatively small area (eg. seagrass beds, estuaries and mangrove areas) (see Adams *et al.* 1999; Nagelkerken *et al.* 2002). In the latter case, strategically placed small MPAs can provide significant protection. While larger, no-take MPAs may be the preferred choice of those managing highly mobile fish, when the social realities of marine tenure and food security are taken into consideration, networks of smaller MPAs that encompass representative spectrums of ecosystem types and that include both NTZs and MUMPA<sub>s</sub>, are considered by many as a more practical and effective approach than fewer large MPAs (Aswani and Hamilton 2004; ISRS 2004:1; Russ and Alcala 1999; but *c/f.* Foale and Manele 2003). What is ecologically optimal must be tempered by what is realistically possible.

In addition to the issues discussed above, other 'limitations' to MPA effectiveness exist. Table 3.2 provides a summarised overview of some of the most common limitations not already mentioned, as some of these additional factors need to be considered when making an assessment of the applicability of MPAs in the context of Marovo Lagoon.

**Table 3.2: (Other) Limitations of MPAs as conservation tools**

<i>Limitations</i>
<ul style="list-style-type: none"> <li>• MPAs can redirect fishing behaviour to other areas which are ‘unprotected’, further intensifying fishing in potentially more vulnerable habitats and life stages (Horwood <i>et al.</i> 1998)</li> <li>• MPAs can become ‘victims of their own success’ as stories of increasing fishery yields become magnets for desperate fishers from elsewhere (Christie, <i>in press</i>; LMMA Network 2003:4-33).</li> <li>• The ‘fishing-the-line’ phenomenon, whereby fishers congregate around the edges of no-take MPAs has the potential to decimate fish exports as the optimal benefits of ‘spill-over’ occur within 500m of MPA boundaries (Russ 2002). This has the potential to undermine the long term viability of a MPA (especially true of smaller MPAs ) (<i>in Roberts et al.</i> 2005:125)</li> <li>• Small MPAs are extremely vulnerable to environmental perturbations such as storms, diseases and pests (Polunin 2002)</li> <li>• MPA management processes become an opportunity and medium through which existing community conflicts and issues can be expanded and objectified (Christie <i>in press</i>).</li> <li>• Tourism, one of the most cited objectives and proxy economic ‘carrots’ associated with MPAs, can also be an engine for social and economic inequity that <b>creates</b> community conflict (Christie <i>in press</i>)</li> </ul>

### **MPA Success and Failure**

This review of limitations hint at the breadth and complexity of MPAs as resource conservation tools. While the prevalence of conflicts related to MPA initiatives are certainly under-reported in the literature (Christie, *in press*), numerous surveys and reviews have been conducted with the aim of assessing MPA effectiveness (see *MPA News* 7(10) 2006). Most of these demonstrate that the majority of MPAs are ineffectual and ‘protected’ in name only (eg. Alder 1996; Kelleher *et al.* 1995; see also overviews *in* Gravestock 2002:15-16; McClanahan 1999:321-2). A conservative summary of these assessments suggests that 70-80% of MPAs are ‘paper parks’ and do not meet their primary conservation objectives.

While most evaluations are undertaken through a ‘western eco-centric’ prism, the sheer volume of the failures suggests that the popularity and optimism surrounding MPAs may not yet be fully warranted. Nonetheless, the outright failure of alternative management regimes cautions against ‘throwing the baby out with the bath water’. Theoretically, the MPA paradigm of restricting fishing effort (‘inputs’) makes sense, especially in ‘developing’ countries where complicated licensing and catch quotas make managing ‘outputs’ impossible to monitor and enforce (Williams 1998:48). Importantly, there are cases where MPAs **are** ‘working’ (see Aalbersberg *et al.* 2005; Aswani 2000; Halpern 2003; Russ and Alcala 2003; TNC 2006); although consensus

regarding both biological **and** social success is difficult to confirm unequivocally, and long-term viability is yet to be proven. Table 3.3 summarises the most frequently listed ‘factors of success’ adapted from a wide variety of sources.

**Table 3.3: Factors influencing MPA success (Literature review)**

<b>Community</b>	<b>Resources/Capacity</b>	<b>Process/Design</b>
Community support	Legal and policy support/framework	Ensure consideration is given to both resource use and conservation
Clear communication processes	Straightforward, not overly complex legislative framework	Regular monitoring and assessment (ecological, social and management)
Involvement of all segments of the local community in all aspects of MPA	Ability to enforce user rights Inputs from local government	Must be tailored to local conditions, attitudes and needs The MPA must be part of integrated management scheme (i.e. ICZM)
Relative community homogeneity	Staff training and availability of technical support	Design and management must be both ‘top down’ and ‘bottom up’
High levels of community decision making	Adequate and long-term financial support	Assessment of local biological and socio-economic conditions of an area prior to the establishment of an MPA
A positive attitude towards rules and collective action	The presence of community conflict resolution mechanisms	The use of both sanctions and incentives to increase compliance
Participatory decision making	NGO presence	Objective and management should be adaptable to changing circumstances (adaptive management)
If CMT, community consensus and formal / informal recognition of such rights	Co-ordination between agencies implementing the protected area Low material/capital expectations from community	Properly defined boundaries
Community has perceived crisis in fish stocks prior to MPA establishment	Successful alternative income projects for community	Long timeframe The application of science to MPA management
Understanding of socio-economic and historical factors		Utilisation of local knowledge
Positive history of other ‘projects’ in community		The ability of the MPA to show tangible benefits and outcomes (e.g. improved fishery yields)

Source: Alder 1996; Alder *et al.* 2002; Aswani 2000; Aswani and Hamilton 2004; Aswani and Weiant 2003; Bunce *et al.* 1999; Dahl-Tacconi 2005; Foale and Manele 2003; Gravestock 2002; Hockings and Phillips 1999; Hockings *et al.* 2000; ISRS 2004; Johnson 1997; Kelleher and Recchia 1998; The Locally-Managed Marine Area Network 2003; Lundquist and Granek 2005; *MPA News* 7(10), 2006; Pollnac *et al.* 2001; Pomeroy *et al.* 2004; Salafsky *et al.* 1999;; White *et al.* 2002)

As identified at the beginning of this chapter, numerous commentators, advocating community-management approaches, have suggested that customary marine tenure (CMT) and associated 'traditional' management practices can constitute an additional, complementary or separate marine resource management regime (see below). A proper engagement with CMT is beyond the scope of this thesis, but a brief discussion is provided so that some of the contextual issues surrounding marine resource issues in the Pacific can be better understood, regardless of debates about the effectiveness of CMT to act as a conservation tool.

### **CUSTOMARY MARINE TENURE**

As implied earlier, many so-called 'customary' management approaches are congruent with the MPA paradigm. As Johannes (1982) notes, Pacific cultures '...devised and practised almost every conservation measure centuries ago, long before the need for marine conservation was even recognised in western countries' (1982:259). Numerous management systems - broadly referred to today as *tabu* systems in Melanesia and *kapu* systems in Polynesia - were 'traditionally' extant in various guises, and involved restrictions on fishing effort via closed seasons, closed areas, size restrictions and/or gear restrictions (Johannes 1978,1982; see Hviding 1996a:chpt.7 for Marovo examples).

The call for this CMT/'traditional' fisheries 'alternative' to be applied to modern fishery problems arose with the pioneering work of Johannes in the 1970s (eg. 1978; 1980). It gained further momentum with the publication of numerous anthologies in the mid 1980s (e.g. Ruddle and Akimichi 1984; Ruddle and Johannes 1985), and support has continued (e.g. Adams 1998; Aswani 2000; Johannes 1998; Hviding and Baines 1992; Ruddle 1998). The foundation of these models is customary marine tenure (CMT) (Johannes 1994). Most researchers follow Hviding's (1989) definition of CMT:

'Customary' refers to a system that emerges from traditional roots, constitutes part of what is often termed 'customary law', and which has continuous links with local history as it adapts to changing circumstances; 'marine' refers to the system dealing with reefs, lagoon, coast, and open sea and including islands and islets contained in this overall seaspace; 'tenure' refers to a social process of interacting activities concerning control over territory and access to resources (Hviding 1989).

If one refuses to adhere to the tradition-as-static paradigm, and accept that regimes can alter and change and still retain 'customary' associations (Hviding 1989:7-8), then formalised MPAs can still be part of, or an extension to, CMT management approaches. The qualifier is obviously that

it must be judged so from a community (emic) perspective. The overarching discursive differences separating MPAs from CMT **in contexts where CMT exists**, seems to be connected to the degree of external (etic) impetus and the associative mantle of 'science'. The more outside directive, formal and 'scientific' a conservation program, the more likely the label of 'MPA' will be used, even when 'traditional' management practices are (re)presented as part of a strategy of persuasion (see Drew 2005; Lam 1998). On the surface one could argue, albeit over simply, that CMT approaches are characterised by 'bottom-up' approaches built on local autonomy and self-reliance (Hviding and Baines 1992:19), while MPAs are more often outside, 'top-down', and scientifically driven. This is an essentialist statement, and a qualification needs to be made that the LMMA Networks initiatives in Fiji and Shanker Aswani's approach in Solomon Islands (for example) could arguably be characterised as representative of a newer, 'middle-up/middle-down' approach (see Aswani 1997b). The important point is that regardless of labels, formally recognised MPAs and other 'modern' management initiatives can exist as an adjunct to, and within, CMT community-led approaches.

Generally, most of the commentary associated with CMT is positive (Anderson 1999 *in* Dalzell and Schug 2002:11): management efficiency (i.e. the cost effective nature of CMT); its contextual flexibility to adapt to modern contexts (Hviding 1998); and the political autonomy and cultural values it harbours, are all widely cited benefits of CMT (Dalzell and Schug 11-13). In addition to its benefits, many scholars acknowledged the vulnerability of CMT practices. Among other things, people increasingly question the ability of tenure institutions to withstand the external onslaught of a global resource based capitalism and its encumbent internal local-level socio-cultural changes (Kinch 2002). In relation to MPAs and conservation aspirations generally, some commentators go so far as to argue that marine tenure is a hindrance rather than a help, and that representations of CMT as beneficial to fisheries management are 'romantically inclined' and unlikely to succeed (Foale and Manele 2003:6-9). Some studies have shown that CMT developed in parts of Melanesia only in response to external pressures (such as trade), and as such they are not necessarily a 'traditional' regime at all (Foale and Manele 2003:9; Kinch 2003:2; but c/f. Hviding 1989:5-6 for critique of such perspectives). The *ad hoc* statutory framework associated with CMT (Ruddle 1998) and the potential for discriminatory inequity to be applied in relation to privatising access and the allocation of resources, are additional critiques used in debates regarding the 'problems' of CMT.

As noted in the last chapter, in Bili's tenured waters 20% of uses are estimated not to have 'traditional' use rights (Kinch *et al.* 2005b:53). This suggests that tenure is weakening in this instance, although it does not necessarily signal its demise all together. The changing facade of CMT foreshadows the difficulties that any 'new' management institution is going to face. Already in Marovo disputes have arisen regarding the IWP and Seacology MPAs, with people from neighbouring villages claiming their customary rights are being infringed upon, and they will not respect the closures as they were not consulted about the MPAs (Morgan Jimmuru, Marovo fisherman, *pers. comm.* 2005; see also Kinch *et al.* 2005b:56). It is now pertinent to explore these issues further through the presentation of my research results (Chapter 4), and see what Marovo people themselves consider to be the primary 'problems' and 'solutions' to the environmental changes occurring in their home.

### SUMMARY

In this chapter I have identified how MPAs have become the primary 'solution' to the 'problem' of in-shore marine dilapidation. The literature suggests that, while there are examples of successes, the numbers of MPAs currently meeting their stated objectives is abysmally small: less than a quarter by most reports. There are numerous debates and perspectives regarding the extant and long-term ability of MPAs to work effectively, but most people are in consensus that limiting inputs (fishing effort) rather than outputs (size/gear restrictions) is in theory a sound paradigm. The burgeoning field of MPA evaluation has identified an expansive list of 'factors of success' - indicators considered integral to the effective implementation and sustainability of MPAs - and these were listed for later reference. In the end, however, the major complications associated with meeting the biological and ecological objectives of MPAs have been identified as not alienating and losing the support of the local communities who rely on and own the resources in question. This remains the biggest challenge.

## CHAPTER 4: METHODS & RESULTS

### INTRODUCTION

This chapter presents selected results of my fieldwork activities and a preliminary evaluation of project and village case studies utilising the ‘factors of success’ indicators introduced in chapter 3. The primary focus of this chapter is to identify salient local perceptions of environmental change, its primary causation (‘problem’) and what Marovo people think may be the best approaches to the development of the ‘solution’. More detailed and additional fieldwork results are available in a UQ-Project report, Love and Ross (2006), with a final anthropological report expected to be published in 2007.

### METHODS

#### Study Design and Rationale

My research methods were designed to meet the primary social research objectives of the UQ-Project (Centre for Marine Studies 2005). The customary anthropological practice of participant observation, household surveys, semi-structured interviews and focus group discussions, in addition to free-listing exercises and a cultural consensus/agreement questionnaire (see below), formed the basis of the research strategy. In continuity with the UQ project’s geographic focus (Figure 2.2), my primary study sites were the villages of Chea and Bili.

#### Surveys

Details of survey instruments, and the number of surveys completed, are listed in Table 4.1.

**Table 4.1: Survey instruments**

Survey		Target(s)	Completed
HHS	Household survey	Head of household plus others present	33
CAQ	Consensus/ agreement questionnaire	Individuals (cross-section of community, male and female, young and old etc.)	63
FG	Focus group discussion	Identifiable groups (women’s groups (Dorcas), high school students, carvers)	5
SSI	Semi-structured interview	Key informants (experienced fisher’s, tourism stakeholders, community representatives, interested persons)	26
ECS	Esky catch survey	Esky fish catch (esky owners and/or intermediaries)	Ongoing

These social survey tools were designed to elicit community attitudes and perceptions concerning a range of issues broadly relating to the domain of 'environmental change' (Love and Ross 2006). The results presented in this chapter are taken (predominantly) from the consensus / agreement questionnaire (CAQ) and household survey (HHS) (Appendices 1a and 1b). Due to length restrictions, raw data from interviews and field notes are not presented. Although household surveys constitute a fairly rudimentary method of social research (Banks 1999), consensus questionnaires do not, and thus a brief elaboration is in order.

### **Consensus/Agreement Questionnaire (CAQ)**

CAQ is properly referred to as a 'cultural consensus analysis'. Cultural consensus analysis evolved under the wider auspices of 'cultural domain analysis', a paradigm of 'cognitive anthropology' (Bernard 2003:500-508; Borgatti 1994; Romney *et al.* 1986). In brief, cultural domain analysis is the study of how people in a group think about 'things' that somehow go together, the aim being to establish how people interpret domains differently (Borgetti 1994, 1996b). A 'domain' can be physical and observable, such as 'plants' or 'symptoms of an illness', or conceptual, such as 'occupations' or 'emotions' (Bernard 2002:280). One of the key strengths of the consensus model is that it focuses on informants rather than on 'variables', and thus directly addresses the issues of who agrees with and acts like whom, about what and to what degree (Handwerker 2001:22; but *c/f.* Furlow 2003 for a critique of CAQ, and Byrne 2002:118-19 for weaknesses of factor analysis generally).

Cultural consensus analysis is both a theory and a method, originally developed by Romney *et al.* (1986) to test informant competence. The initial idea was to establish the level of an individual's knowledge of a particular 'domain' without having to know the answer to the questions being investigated (Romney *et al.* 1986). The resulting 'analysis' provides a culturally correct 'answer key' to a given series of questions, a ranking of an individual informant's 'competence' relative to other informants, and a way of identifying intra-group variability (Borgetti 1996b:40). The survey instrument comprises a set of statements or questions in a 'true/false' or 'yes/no' format, with the results subsequently coded into numerical binaries (zeros and ones). A factor analysis of the resulting similarity matrix uses proportional matches to compute 'competency' scores for each respondent, applies a probability formula to correct for guesses and produces a series of eigenvalues (Bernard 2002:195; Borgetti 1996b). It is generally accepted that a ratio of 3 to 1 in the resultant eigenvalues is adequate to argue for the core assumption that a single underlying

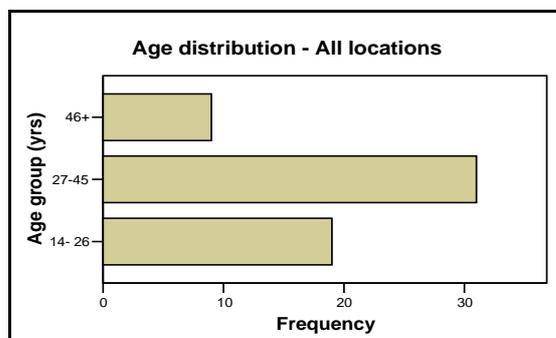
structure of the matrix is in evidence (Bernard 2002:195; Borgetti 1996a:45). A computer program package called ANTHROPAC 4.0 (Borgetti 1996a) contains the relevant modules for conducting an automated cultural consensus ‘analysis’.

This technique has recently been used to interesting and productive ends in applied marine contexts (Aswani 2005; Miller *et al.* 2004; Miller and Grant 2004), and I drew not only inspiration from these studies but also openly ‘borrowed’ some questions from their instrument schedules, especially Aswani’s (2005). The CAQ was produced in the Marovo language with assistance from one of my two key research assistants. Both instruments were cross checked with a number of community members and field tested before commencing work.

### Sampling Size and Distribution

The sampling strategy was influenced by the amount of data already available, the temporal limitations of the fieldwork and socio-cultural and political constraints. Overall, 15 HHS (conducted in Pijin by the author) and 31 CAQs were completed in Bili, and 14 HHS and 27 CAQs in Chea. Almost every HHS included one CAQ. It is estimated that the HHS resulted in approximately 30 – 40% coverage of occupied households, with the CAQ sampling about 15-20% of relevant (‘adult’) individuals from each village (Love and Ross 2006:13). Distribution of sampling effort was decided through a combination of ‘snowballing’ and ‘purposive’ sampling techniques. ‘Snowballing’ is a technique whereby informants are asked to nominate other informants (and so on), while ‘purposive’ sampling targets specific individuals and/or groups (see Bernard 2002:182,186). The CAQ also utilised ‘convenience’ sampling - a short-hand term for ‘...grabbing whoever will stand still long enough to answer your questions’ (Bernard 2002:184). Figure 4.1 and Table 4.2 presents details of age and gender distribution.

**Figure 4.1: Age distribution**



Source: HHS and CAQ (n=64)

**Table 4.2: Gender representation by location**

Gender	Bili	Chea	Misc. villages
Males	26	19	4
Females	6	8	1

Source: HHS and CAQ (n=64)

## RESULTS

The results of the social surveys that are most pertinent to this thesis are primarily those concerned with: **environmental change** - ascertaining people's perceptions of 'problem(s)', including levels of concern and what, if any, 'solutions' they may have about mitigating such changes; **resource management issues** - the extent of local awareness of government and (where relevant) community rules and regulations, in addition to who respondents think should be principally responsible for resource management decisions; and **MPAs** - people's level of awareness, compliance with and general attitude towards the MPAs in each village.

### Environmental Change

The majority of respondents (94%) stated that the lagoon had undergone significant change, relative to their parent's generation ( $n=32$ ). Respondents who answered in the affirmative were encouraged to elaborate. Table 4.3 presents a summary of the main responses.

**Table 4.3: Indicators of environmental change: HHS**

Response	Frequency
Fish and other marine species have decreased	15
Water is dirty	18
Coral is dying & changing colour	4
No change	2

Source: HHS (Categories  $n$ =various; Respondent  $n=32$ )

As an adjunct to the HHS, the CAQ also contained a number of statements relating to specific indicators of 'environmental change' (Table 4.4). Many of these indicators were elicited unprompted from informants during an earlier scoping trip (Love 2005). Responses confirm that significant environmental changes have occurred, especially in terms of increased water turbidity, macro algal levels and overall coral reef degradation. A formal 'consensus analysis' of the agreement matrix reveals overall respondent consensus, with statistically valid eigenvalues for both Chea and Bili [Chea: Eigenvalues Factor (1) 25.730; (2) 0.966; Bili: Eigenvalues Factor (1) 25.568; (2) 2.344. These are much higher ratios of first-factor to second factor eigenvalues than the required 3-1 recommended (Borgatti 1992)]. Respondents in Chea showed more agreement and less deviation than informants in Bili; a trend evident throughout the research (Love and Ross 2006:34).

**Table 4.4: Indicators of environmental change: CAQ**

Code	Statement	Bili		Chea	
		False/Disagree	True/Agree	False/Disagree	True/Agree
Q51EC	The sea ( <i>idere</i> ) is as clear as it has always been	28 <b>90%</b>	3 <b>10%</b>	27 <b>100%</b>	0 <b>0%</b>
Q3EC	There are as many giant clams ( <i>ose</i> ) in the lagoon as before	29 <b>94%</b>	2 <b>6%</b>	27 <b>100%</b>	0 <b>0%</b>
Q19EC	Some corals ( <i>iduka</i> ) have changed colour and become white	0 <b>0%</b>	32 <b>100%</b>	1 <b>4%</b>	26 <b>96%</b>
Q33EC	Some of the reefs ( <i>saghauru</i> ) are dying	0 <b>0%</b>	32 <b>100%</b>	0 <b>0%</b>	27 <b>100%</b>
Q34EC	There is less alga - Halimeda sp. ( <i>tatalo</i> ) than before	4 <b>14%</b>	24 <b>86%</b>	2 <b>8%</b>	24 <b>92%</b>
Q10EC	Dead tabular coral ( <i>voa legudi</i> ) are increasing in numbers	1 <b>3%</b>	31 <b>97%</b>	0 <b>0%</b>	27 <b>100%</b>
Q46EC	There is as much coral ( <i>binubinuani</i> ) as before	32 <b>100%</b>	0 <b>0%</b>	27 <b>100%</b>	0 <b>0%</b>

Source: CAQ

(n= various, from 54 - 59)

### Fishery Changes

A variety of questions were related to people's perspective on the status of past, present, and future fisheries, articulated in terms of volume and ease of catch (Table 4.5 and Figures 4.2a and 4.2b).

**Table 4.5: Fishery changes: Abundance**

Code	Statement	Bili		Chea	
		False/Disagree	True/Agree	False/Disagree	True/Agree
Q16EC	There are not as many fish in the lagoon now as there was 10 years ago	4 <b>18%</b>	28 <b>82%</b>	0 <b>0%</b>	27 <b>100%</b>

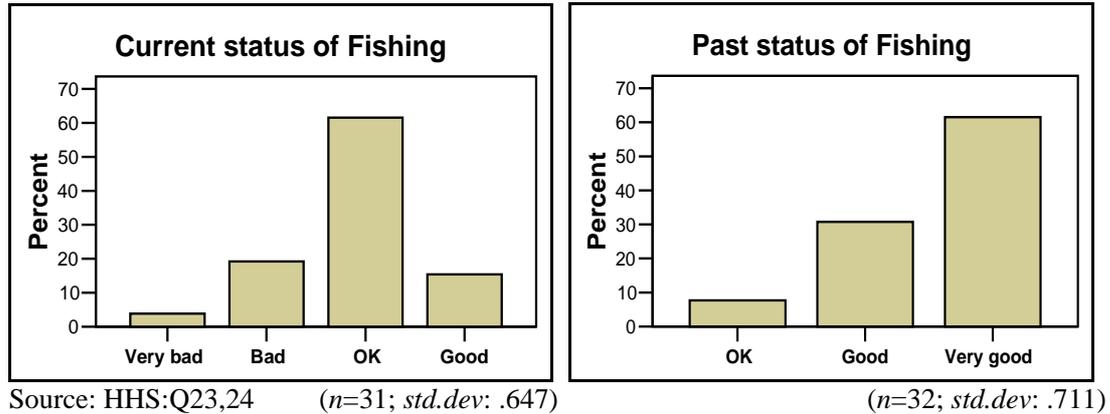
Source: CAQ

(n=59)

There was overall consensus that fin-fish abundance had decreased, but fewer consensuses in Bili than Chea. In terms of diachronic change (see below), 61.5% of respondents stated past catches of fish were 'very good', with the same percentage of people reporting fish catches over the last year to be 'ok' (61.5%). While a combined 23% of people reported current fishing to be 'bad' (20%) or 'very bad' (3%), the majority of respondents do not appear overly concerned (n=32).

Respondents were asked to list ten of the most commonly caught fish and were additionally queried if these were the same fish as they were catching 10 or 20 years ago (depending on the age of the respondent). If the answer was 'no', people were further requested to name the fish species that were 'harder to catch today' (HHS:Q19a and 19b). Table 4.6 provides an overview of the results (see Love and Ross 2006:35-36 for details of fish species composition).

**Figure 4.2: Summary of attitudes regarding (a) Current, and (b) Past fishing status**



**Table 4.6: Fishery changes: Diversity**

	Bili	Chea
No (change in species variety)	0 0%	9 64%
Yes (change in species variety)	10 71%	5 36%
Not sure	4 29%	0 0%

Source: HHS:Q19a (n=28)

These results reveal some interesting anomalies between the two main study sites. The majority of respondents in Chea stated that there had **not** been any change in fish species representation, while the majority of respondents in Bili reported the opposite. While the elder women in the Chea women’s fellowship group ‘Dorcas’ stated there had been some changes, they did not list as many fish as did the counterpart women’s group in Bili. Although the sample size is small, the differences are still statistically significant [T-test, sig. (2-tailed) p=0.000] and are unlikely to be ‘explained’ by reference to sampling issues alone.

Both survey instruments contained questions about the ‘future of fisheries’ (Table 4.7).

**Table 4.7: The Future of fisheries**

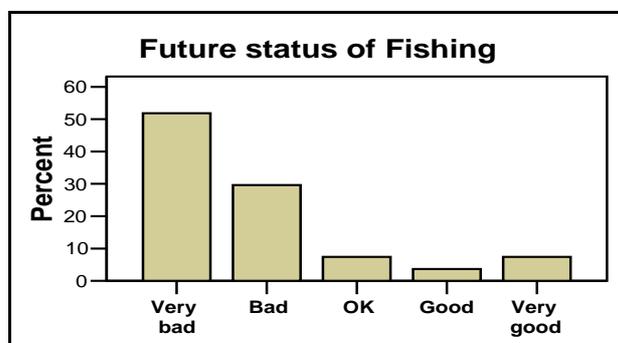
Code	Statement	Bili		Chea	
		False/Disagree	True/Agree	False/Disagree	True/Agree
Q2PERS	There will be enough fish for us in 10 years time	19 59%	13 41%	19 51%	8 49%
Q28PERS	There will always be enough fish in the lagoon to feed me and my family	17 53%	15 47%	20 74%	7 26%

Source: CAQ (n=59)

Responses to the CAQ were mixed, revealing weak consensus overall. Nonetheless, slightly more than half of the respondents were pessimistic in their outlook. The inconsistency is not correlated

with age differentiation, but there is some correlation when interpreted relative to gender, with females displaying more consensus than males (Love and Ross 2006:38).

**Figure 4.3: Summary of attitudes regarding the ‘future of fishing’**



Source: HHS:Q25 (n=31; std.dev: 1.199)

### The Problem

Respondents were asked to nominate what (if any) they considered to be the major problem and/or threats to the health of Marovo Lagoon (Table 4.8).

**Table 4.8: Threats**

Main Threats	Bili	Chea	Misc. villages	% Total
Logging	12	13	3	68 %
Over harvesting	4			10 %
Waste (oil etc.)		2	2	10 %
Solomon Taiyo	1	2		7 %
Community disharmony	1			2 %
None		1		2 %

Source HHS:Q28 (n=32)

Logging, rather than over-harvesting, is unanimously considered the number one threat/problem in the lagoon. These issues, like the ‘solutions’ list that follows (Table 4.9), were elicited unprompted. These results are discussed further in detail in Chapter 5.

### Resource Management

Both the HHS and the CAQ explicitly inquired about resource management issues. In the HHS, if respondents stated that they thought there were problems with the lagoon environment, they were asked if they had any ideas about **how** to solve these problems and **who** should implement these solutions (Table 4.9).

**Table 4.9: Solutions: What, how and who**

What should be done	Bili		Chea		Combined Total
Better manage resources	5	26%	9	56%	39%
Stop logging/Not allow logging	7	37%	4	25%	29%
Better education	2	11%	0	0%	7%
Have enforceable community regulations	2	11%	1	6%	7%
Stop Solomon Taiyo (bait-fishing)	0	0%	1	6%	3%
Don't know	3	15%	1	6%	15%

Who should do it	Bili		Chea		Combined Total
Government <i>and</i> landowner	8	42%	5	29%	41%
Landowner/Community	2	10%	6	35%	21%
Government	4	22%	2	12%	15%
Company (w/ other stakeholders)	0	0%	2	12%	5%
Chief	1	5%	1	6%	5%
Help from NGOs	2	10%	0	0%	5%
Don't know	2	10%	1	6%	8%

Source: HHS:Q31a &amp; 31b

(n=32)

The CAQ explicitly inquired as to whom people thought were primarily responsible for fisheries resource management (Table 4.10)

**Table 4.10: Responsibility for fisheries management**

Code	Statement	Bili		Chea	
		False/Disagree	True/Agree	False/Disagree	True/Agree
Q44RM	The Church should be more involved in decisions about fishing	3 10%	28 90%	22 81%	5 19%
Q13RM	The Government should control fishing	11 35%	20 65%	22 81%	5 19%
Q11RM	Fishing would be better if the Chiefs controlled it	1 3%	31 97%	0 0%	27 100%
Q23RM	The Church should control fishing	4 13%	26 87%	26 96%	1 4%

Source: CAQ

(n=various, 57 - 59)

Ideas about broad 'solutions' and who should implement them varied. The majority of respondents from Chea believed 'better management of resources' was the optimal 'solution' (56%), while in Bili 'stopping logging' was the most cited response (37%). In terms of who should implement 'solutions', respondents from Chea were more in favour of solely community led action (35%), in contrast to Bili where respondents saw the 'government and community' (42%) and 'government only' (22%) as the most viable vehicles for implementing 'solutions' (Table 4.9). These differences are statistically significant [p=.000].

This trend is further evidenced in relation to fishery resource management (Table 4.10). In Chea, respondents consistently stated that it was the community's responsibility to manage fishery resources and make decisions, while in Bili the vast majority of respondents favoured the Church and Government taking charge. However, respondents in both villages overwhelmingly supported the statement that 'Fishing would be better if the Chiefs controlled it' (mean of 98.5%).

Inter-village difference is less evident in relation to people's attitudes regarding large-scale commercial resource extraction issues (Table 4.11).

**Table 4.11: Consensus regarding 'Development' issues**

Code	Statement	Bili		Chea	
		False/Disagree	True/Agree	False/Disagree	True/Agree
Q26DEV	The money from logging and bait-fishing is important for the country	18 <b>56%</b>	14 <b>43%</b>	26 <b>96%</b>	1 <b>4%</b>
Q8DEV	Logging is important for the national economy	23 <b>72 %</b>	9 <b>18%</b>	26 <b>96%</b>	1 <b>4%</b>
Q21RMDEV	Conserving the lagoon will help me make more money	2 <b>6%</b>	29 <b>94%</b>	1 <b>4%</b>	26 <b>96%</b>
Q41RMDEV	Conserving the lagoon is only useful if there is money for 'development' and jobs	1 <b>3%</b>	31 <b>97%</b>	0 <b>0%</b>	27 <b>100%</b>

Source CAQ

(n =various, 58 - 59)

### **Awareness of Rules and Regulations**

Respondents were asked about their knowledge of National and/or Provincial marine related regulations. Nationally, there exists the *Environment Act 1988*, *Fisheries Act 1998* and the *Wildlife Protection Act 1998*, while provincially there are a few (theoretically) relevant legislative mechanisms, such as the *Western Province Coastal and Lagoon Shipping Ordinance 1991* and the *Western Province Resource Management Ordinance 1994* (IWP 2003; McDonald 2006). Over half of all respondents (62%) stated that they were not aware of any Government rules or regulations, with more people in Chea (8) than Bili (3) stating that they were aware of Government or Provincial rules regarding fishing (n=28) (Love and Ross 2006:44).

Only Chea has a formally established community resource management plan, the *Resource Policy Framework* (Chea Village Community 1991a, 1991b). The policy is extensive, covering: prohibitions against clearing mangroves; using dynamite; using nets for commercial purposes; restrictions on spear fishing, trochus and bêche-de-mer collection; and provision for written authority to announce temporary *tabu* (customary closures) over reef areas (Chea Village Community 1991b). All of the HHS respondents in Chea were aware that the community had a

*Resource Policy Plan*, although details of its contents were either not well known or respondents were not willing to discuss it. One respondent, in open disregard to one of the regulations, acknowledged using a net for esky fishing (Love and Ross 2006:44).

### **Marine Protected Areas (MPAs)**

As already noted, two NGOs are currently establishing MPAs in both Bili and Chea's territorial waters: The International Waters Project (IWP) have a proposed MPA in both communities, and Seacology have a further two MPAs in Bili. While the MPAs were still in the process of being 'formalised' during my fieldwork, it was well known amongst the community and project personnel that the MPAs were meant to be in operation. Several questions were incorporated into the HHS, CAQ, and semi-structured interviews relating to MPAs after some people raised the issue, unprompted, during my scoping trip in July 2005.

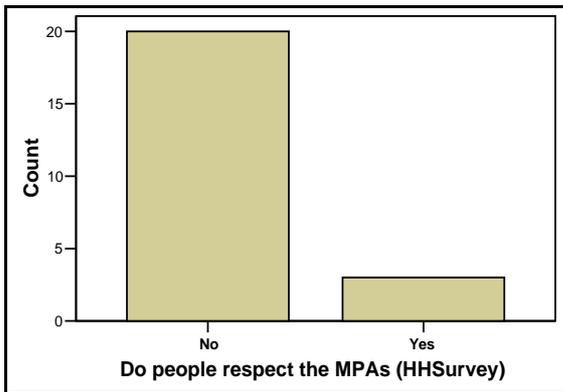
### **Awareness of MPAs**

The majority of respondents were aware of the MPAs (71%), with slightly more people in Bili than Chea claiming knowledge of the MPAs ( $n=28$ ). Respondents who were aware of the MPAs were asked to name the organisation or agency responsible for their establishment. All but one respondent in each community mentioned IWP. In Bili, where a further two MPAs are being established by Seacology, only two people could name the implementing agency and only one respondent knew the location of the Seacology MPAs ( $n=13$ ) (Love and Ross 2006:45).

### **MPA Compliance**

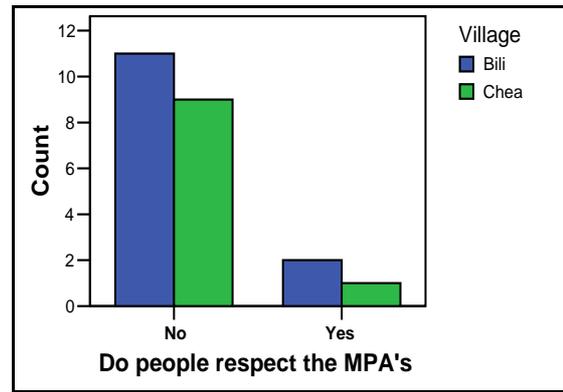
Several questions were incorporated into the surveys in an attempt to ascertain people's opinions about the current 'effectiveness' of the MPAs (Figures 4.5 and 4.6 show results from the HHS; Figures 4.7 and 4.8 present responses from the appropriate CAQ). These combined results clearly show that MPA compliance is low. While the overall ratio and trend of responses are the same, the extent of agreement is slightly varied relative to the survey instrument used. Village cross-tabulation shows that respondents from Bili thought people fished in the MPAs more than did people from Chea, although the difference is not statistically significant.

**Figure 4.5: MPA Compliance: Total Count**



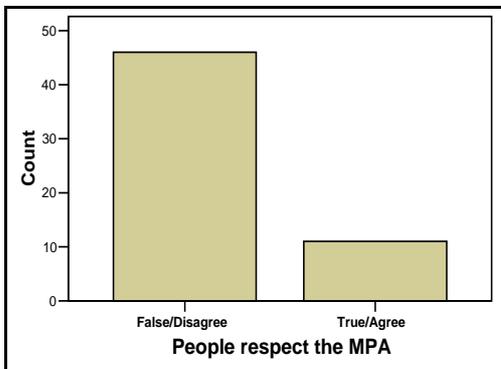
Source: HHS:Q36

**Figure 4. 6: MPA Compliance: Village Count**



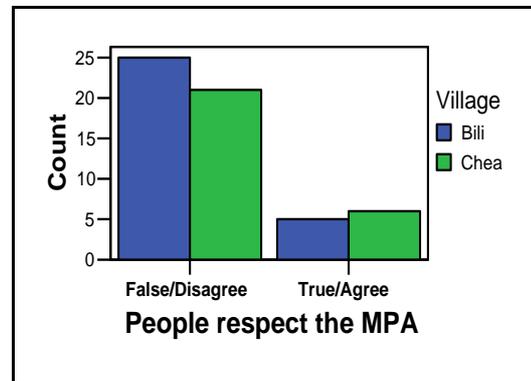
(n=23)

**Figure 4.7: MPA Compliance: Total Count**



Source CAQ:24

**Figure 4.8: MPA Compliance: Village Count**



(n=58)

### Why do people fish inside the MPA?

People were asked why they thought people continued to fish in the MPAs (Table 4.13). In Chea, the primary reason given by respondents for the lack of compliance was the absence of markers or buoys (50%), while in Bili, the majority reason proffered was a lack of ‘proper community engagement’ (27%). ‘Proper community engagement’ represents comments such as ‘...IWP say stuff but don’t do it’ (i.e. promised ‘alternative livelihood programs, buoys, more village visits)), ‘...the MPA doesn’t work because they haven’t come back’, ‘...promise development but nothing’. Several people in Chea argued that even if there were markers, neighbours would still not respect the MPAs as they have a customary right to fish in the same territorial waters. In both villages people stated that disputes have surfaced over the MPAs with neighbouring villagers who had not been involved in consultations over the establishment of the MPAs (see also Kinch *et al.* 2005b:56).

**Table 4.12: Why people fish in the MPAs: Categories of Responses**

Why do people fish in the MPAs	Bili	Chea	Combined Total
No buoys/markers	1 9%	6 50%	31%
Lack of proper community engagement	3 27%	2 17%	22%
Lack of adequate education/awareness campaign	2 18%	1 8%	13%
No enforcement or regulation	1 9%		4%
Outside idea		1 8%	4%
Don't know or answer not given	4 36%	2 17%	26%

Source: HHS:Q35

(n=23)

**‘Factors of Success’: Assessing Community and Project Attributes**

This section of the results uses a number of indicators adapted from the summarised list introduced in Chapter 3, Table 3.5, to conduct a preliminary assessment and evaluation of community and project attributes. The assumption is that the more indicators found, the more likely it is that the MPAs will be successful and sustainable. Table 4.13 lists various *in situ* factors ideally extant in the community and/or region, while Table 4.14 lists various *ex situ* indices ideally prevalent in the activities, processes and general workings of the agency implementing MPAs.

These admittedly self referenced and preliminary results nevertheless demonstrate that many of the so-called ‘factors of success’ are not in evidence; either in the communities or amongst the two projects under investigation. In terms of community attributes Chea has nearly twice as many relevant ‘factors’ than Bili (64% vs 37%). In relation to project attributes, IWP meets more criteria than Seacology (33% vs 11%). This is discussed in more detail in Chapter 5.

**Table 4.13: ‘Factors of Success’: Indicators for community**

	BILI	CHEA
<b>Community</b>		
Involvement of all segments of community		
Involvement of community in monitoring & evaluation	x	x
Formal participatory aspect to project	X	X
High levels of community decision making		x
Commitment to Protected areas amongst all/most community members		
(Relative) Community homogeneity		X
Consensus regarding perceived crisis in fish stocks	x	
Legal & Policy framework – Community level		X
Adequate informal, community level conflict resolution mechanism		x
Awareness of legal & policy framework		
Enforceability of collective action decisions	-	-
Tenure recognised and respected	X	X

**Note:** X = Yes (a lot); x = Yes (a little); blank = No/none; - = not able to make judgment (too early to tell or not applicable)

**Table 4.14: ‘Factors of Success’: Indicators for assessing project performance**

	IWP	Seacology
<b>Resources/Capacity</b>		
Legal & Policy framework – Government/Provincial level	X	X
Availability of technical support	x	
Training of some community members	x	
Adequate & long term financial support		
NGO presence in community/region		
Co-ordination/communication between implementing agency and other NGOs	x	
<b>Process/Design</b>		
Consideration given to both resource use (sustainable use) & conservation (environmental protection) (i.e. zoning of human activities within an MPA)		
Ongoing monitoring and assessment (ecological, social & management)		
Assessment of local biological & socio-economic conditions	X	
Sanctions <i>and</i> incentives used to increase compliance		
Adaptive management process		
Mod.-High utilisation of local knowledge		
Clear & properly defined boundaries		
The application of science	x	
The ability of MPA to show tangible benefits	-	-
Incentive component to MPA establishment		X
Alternative income generation component to project		
MPA part of broader integrated ecosystem management schemes, such as ICZM program		

**Note:** X = Yes (a lot); x = Yes (a little); blank = No/none; - = not able to make judgment (too early to tell or not applicable)

### SUMMARY

This chapter has provided an overview of the fieldwork methods and presented a summary of the most pertinent results. Among the most significant ‘findings’ are the intra-cultural differences identified between the two communities regarding a number of issues. These differences are most clearly evident in relation to: **inter-community consensus**, with Bili less ‘homogenous’ in informant responses overall, relative to Chea; **fishery changes**, with respondents in Bili stating that there had been more change in fish species representation than respondents in Chea; and **resource management**, with respondents in Chea favouring internal, community lead initiatives while their counterparts in Bili prefer external assistance, such as Church or government partnership programs. These differences have significant consequences for management aspirations, as elaborated in Chapter 5. It is now pertinent to weld together these results with a number of the important issues identified in earlier chapters and to explore marine conservation aspirations in the Marovo context, including an investigation of projectised epistemologies through the conceptual schema of ‘problem’, ‘solution’ and ‘process’. This will be undertaken in the next Chapter.

## CHAPTER 5: DISCUSSION

### INTRODUCTION

The aims of this chapter are to elaborate on and interpret the results presented in the previous chapter; to undertake a critical investigation of the project case studies by exploring their primary objectives and assumptions; and to review the applicability of MPAs as a resource management tool for Marovo Lagoon. I concentrate mainly on the IWP and Seacology projects as I am primarily interested in MPAs and applied management practices. To accomplish these tasks I use the categories of ‘**problem**’, ‘**solution**’ and ‘**process**’ as a conceptual device to frame my arguments and discussion. In closing, I introduce the anthropological prism of ‘counter-tendencies’ to elaborate upon the limitations of homogenous and overly-directive **projectised epistemologies**, using illustrative examples to demonstrate that ‘closed-system’ approaches to understanding environmental change and resource management cannot adequately deal with the ‘unanticipated consequences’ and complexities characteristic of such interventions.

### THE PROBLEM

*Fix the problem, not the blame*

(Japanese Proverb)

The majority of respondents clearly stated that Marovo Lagoon has undergone significant environmental changes relative to a generation ago (see Table 4.3). In terms of causation, only 10% of people stated (unprompted) that overfishing was a threat/problem to the lagoons health (Table 4.7). Additional interviews, focus group discussions and Chea’s community report (Chea Village Community 2003b) clarifies that segments of the community, especially older people, **are** concerned about overfishing. The integral issue for this discussion is that the majority of respondents stated that the current *status quo* of fishing was ‘ok’ or ‘good’ (Figure 4.2), even though evidence suggests that there are significant gaps in species representation (Tibbets *et al.* forthcoming). While approximately 50% of respondents were concerned about the status of fisheries in the future (Figure 4.3 and Table 4.7), it is nonetheless clear from this and other anecdotal evidence that many people are not overly concerned about fishery declines. This result has consequences for resource management aspirations and is connected to a phenomenon known as the ‘shifting baseline syndrome’.

### **‘Shifting Baseline Syndrome’ and Fluid Epistemologies**

It is regularly espoused that marine conservation programs are only likely to succeed if there is widespread local consensus that there is a ‘problem’; i.e. fish populations are in decline (eg. LMMA Network 2004: chpt.4). However, such judgements are always relative. What is the temporal benchmark or ‘baseline’ with which to measure fisheries health - ten, twenty, or a hundred years before present? In the Solomon Island’s, where 45% of the population is under 15 years of age, this baseline is a highly flexible contour. Pauly (1995) labelled this phenomenon the ‘shifting baseline syndrome’ after noting that each generation of fishery researches tends to accept as a baseline the stock size and species composition contingent upon their own experience at the beginning of their careers. As this baseline shifts (through each generation of researches), there are increasingly reduced expectations of resource status, resulting in inappropriate reference points for evaluating overfishing or other disturbances, and for establishing objectives for restoration (Pauly 1995).

This locally perceived ‘shifting baseline’ poses a challenge as the later a ‘problem’ is recognised and acted upon, the longer it will take for any intervention or action to ‘fix’ it. This ‘syndrome’ is further compounded by the fact that local knowledge is decreasing, due to diminishing experiential contact with the local environment. According to the older members of the communities, the younger generation is simply less knowledgeable about *kastom* issues generally, including local environmental knowledge. The fact that young people are obliged to attend boarding schools outside their home *puava* accentuates this gap. It was also frequently remarked that the seasons (*hecha* and *mohu*), and the monthly and lunar timing of fishery migrations and spawning activities are not as predictable and dependable as in the past (eg. informant D1, *interview*)<sup>3</sup>. These factors all contribute towards an epistemological dissolution of sorts which makes it harder to ‘remember’, appreciate, or establish what the status or ‘original’ baseline of fisheries abundance and overall lagoon health once was. One of the benefits ascribed to no-take MPAs is that they can circumvent this issue by providing a window into the past that acts as comparative baseline for future reference (Bohnsack 2003).

A connected ‘complication’ of note is the process orientated nature of Marovo epistemology. Consider the following quoted refrain: ‘My father told me about this, but I had to see it for myself before I could really trust it. So I went out to the reefs and found out about it, and now I know’ (quoted *in* Baines and Hviding 1992:101). This comment refers to the fact that in Marovo epistemology the acquisition and validation of ‘knowledge’ (*inatei*) is a matter of

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<sup>3</sup> A list of informants quoted or paraphrased herein is included listed in Appendix 2.

transgressing through different states of ‘knowing’ (Hviding 1996b:170-174). From ‘hearing about something’ (*avosoa*) a state of ‘knowing’ (*atei*) is attained, and contingent upon context and past and subsequent knowledge inputs, this state of *atei* may transform into ‘believing’ (*va tutuana*), which through repeated verification of ‘seeing for oneself’ (*omia*) is subsequently transformed into ‘trusting’ (*norua*) and the state of ‘being wise’ (*tetei*) (Hviding 1996b:172). For a consensual perspective of the changing status of the lagoon’s health to become entrenched, a consensual state of *norua* is desirable.

Recognition of this local episteme suggest to me that ‘information and awareness’ strategies such as power-point presentations and/or printed prose, while arguably ‘helpful’, do not carry the same local weight as they might for ‘western’ audiences. This acknowledgment supports the premise that conducting local, regional, and even international cross-cultural exchange programs, whereby people can ‘see for themselves’ what challenges and management mechanisms people are facing and utilising in other, perhaps more degraded contexts, is a worthy addition to any resource management strategy. Just as these previously noted factors impinge on local people’s perceptions of the ‘problem’, extra-local researchers’ concerns are shaped by different epistemological and philosophical notions, and these are not necessarily of the same and **kind** or **degree** as those of Marovo peoples’.

### **Different Agendas - Different ‘Problems’: Projectised Epistemologies and Overfishing**

Today, it is widely recognised that ‘western’ conservationist perspectives, most notably the reification of biodiversity, simply does not match the utilitarian pragmatics of the rural life-ways of indigenous peoples (eg. Fairhead 1993; 2000; Foale 2001; Hviding 2003; Hviding and Bayliss-Smith 2000:chp.11). What these and other scholars have highlighted is that conservationists often use a discourse(s) of biodiversity and nature as belonging to ‘all of humankind’ to justify their own preservationist agenda, often with negative consequences for the local peoples who own and reside in the ‘wilderness’ in question. It is not my intention to re-visit these particular critiques of ‘green imperialism’ here, other than to highlight that in relation to the case studies under investigation different project agendas impact on how ‘problems’ are identified and perceived, and subsequently how ‘solutions’ are formulated. This is perhaps most notable in the manner in which the causal factors of ‘monetisation’ and ‘population pressures’ are used in discursive representations of ‘overfishing’.

As already noted, in the primary literature, the major **causation** of marine degradation is overfishing (Chapter 3). In ‘developing’ contexts such as the Solomon Islands, the principal

contingent causes of overfishing are almost always cited as the twin factors of a '**growing population**' and '**increasing monetization**' (eg. Kile 2000; Lafranchi and Greenpeace Pacific 1999; Lam 1998; Lovell *et al.* 2004). While I do not question the reality of over-fishing, I do question the uncritical assumptions and near meta-status that these 'evil-twin' causal factors have attained.

While population growth in the Solomon Islands is significant at around 2.8% per annum (Solomon Islands Government 2002:10-11), Malthusian overtures that increasing population is the dominant cause of over-fishing is not as clear cut as one might suspect. Widespread assumptions that the population of Marovo Lagoon is greater now than in the past are questionable, with recent studies convincingly arguing that a complex agroforestry system based on wetland taro cultivation once supported population densities that are historically greater than, or equal to, present population levels (Bayliss-Smith, Hviding and Whitmore 2003). The fact that more people are fishing today than ever before is not related to population increases alone, but also to an increase in the active fishing **proportion** of the population, with more women and children fishing today than in the past, as customary sanctions have collapsed under Christianity and other socio-cultural changes (see Agassi nd.; Hviding 1996; Love and Ross 2006).

Transformations in fishing technology have had more of an effect on overfishing than population factors. The introduction of technologies such as metal hooks, nylon lines, powered boats, esky boxes, nets, spear guns and under-water torches have enabled fishers to maximise their local knowledge and greatly improve on individual catch-per-unit-effort (Dalzell and Schug 2002: 6; Hamilton 2003; Smaalders and Kinch 2003). While technological changes are connected to 'increasing monetisation', they are not completely dependent upon it. Trade and innovative reproduction, such as the locally produced spear gun that is ubiquitous throughout much of Marovo, does not necessarily require direct and active participation in a monetary system to become widely utilised. In coastal contexts such as Marovo Lagoon people have engaged and traded with outsiders for generations and 'increasing monetisation' is not an essential pre-requisite for intra-cultural material and ideological exchange (see Hviding 1996:chp.3).

With regard to the discursive gloss of 'increasing monetisation' I do not take issue with the sentiment so much as the complexities it masks and the uncritical connotations it implies. Just as the concept of the 'economy' as a separate social sphere marked the beginning of novel forms of socio-technical and political practices in the early 20<sup>th</sup> century (Mitchell 2005),

‘monetisation’ is a discourse of the 21<sup>st</sup> century that accentuates otherness, implies backwardness and clarifies little. St. Martin (2004) demonstrates how binaries such as artisanal/industrial and commerce/culture constitute part of a dialogue that furthers capitalistic logic and delimits alternatives for fishery management in the ‘first-world’ (St. Martin 2004). Lurking within the shadow of these same binaries is the ‘subsistence’ versus ‘monetary’ dichotomy which, I would argue, has now lost much of its heuristic usefulness in light of the environmental, economic and socio-cultural changes that radically alter people’s livelihood practices (Chapter 2). In some places in the Pacific the decline in marine resources is already so severe that people are forced to rely upon imported, less nutritious foods in order to survive (UNEP 2005:4). To simply **subsist**, these people must have some involvement in the monetary economy. In sum, the subsistence/monetary dichotomy no-longer represents local ‘ways of knowing’ or ‘doing’, and the relationship between monetisation and overfishing is complex and not a linear cause-effect equation. Put another way, blaming ‘monetisation’ for overfishing is like blaming food for obesity - it is a gross simplification that masks a multitude of additional factors.

Finally, the discourse of ‘monetisation’ is problematic in terms of its ‘politics of representation’. Un-reflexive and qualified statements about ‘monetisation’ can carry unpalatable connotations of Rousseau’s noble savage, whereby the ‘non-western’ other is viewed as tainted (less exotic) once his/her hand has touched the corrupting power of money. This is most noticeable in the emotive and sensationalistic language used in the ‘western’ NGO ‘grey literature’, such as LaFranchi and Greenpeace Pacific (1999), Oliver and Greenpeace (2001) and Shearman and WWF (1999). Implicitly and explicitly these reports admonish local people for allowing logging and other large scale commercial activities, instead of embracing ‘sustainable’ practices such as paper making, eco-tourism and small-scale logging practices. Among other things, these perspectives ignore the fact that people have ‘large’, not ‘small’, developmental aspirations (Hviding 2003; Hviding and Bayliss-Smith 2000:chp.11; see also Foale 2001).

In short, the discursive coupling of ‘population’ and ‘monetisation’ as primary contingent factors in over-fishing is an over simplification of the issue(s). While part of a bundle of factors contributing to overfishing, presenting these factors as monumental forces hides a host of other factors. This is more than academic importance. By focusing attention on the behaviour of local people this interpretation fails to capture the macro disturbances (such as governmental corruption, commercial fishing, prohibitive school fees) that set off new

patterns of behaviour at local levels (Ellis 2000:118-122; and see also below). In other words, the this model can all too easily make the ‘rural poor’ a scapegoat for environmental deterioration that merely that lets commercial and state forces off the hook (i.e. bait-fishing, LRFFT, illegal commercial fishing activities). Further, it is uncritical, teleological perspectives of **problems** and **causes** that feed into, and ultimately make viable, overly simple, one-size-fits-all ‘solutions’ such as MPAs.

## THE SOLUTION

*The solution to a problem changes the nature of the problem*  
(John Peers)

In deductive, ‘western’ epistemological fashion, once a problem is defined the next step is to identify potential ‘solutions’. This section of the discussion presents an overview of the results relating to community perspectives on the ‘solution’, and explores some of the probable factors related to the intra-cultural variation extant between Bili and Chea in regards to local perceptions of ‘the solution’ and ‘pathways to change’ generally.

### **Local Perceptions and Intra-cultural Difference**

My research demonstrated that there was considerable intra-cultural differentiation in terms of people’s perceptions of ‘solutions’. To briefly recap, this was most notable in relation to **who** people thought should be primarily responsible for implementing management ‘solutions’. Informants from Chea favoured community-lead action, whereas in Bili, government and community partnerships, or solely the government, were the preference (Table 4.11). This result was also paralleled in the more substantive consensus questionnaire, with respondents from Bili favouring government and church involvement in fisheries management, in contrast to respondents in Chea who consensually opposed such influences. This inter-community discontinuity is primarily related to socio-political and micro-historical particulars, as detailed in chapter 2. Here, it was shown that relative to Chea, Bili community is more ‘fractured’. This is objectified, for example, in the heterogeneous nature of chiefly office, the out-migration to nearby hamlets and the in-fighting stemming from logging and kinship disputes. This (relative) ‘fragmentation’ is expressed through the ‘variate trace’ (Byrne 2002:29-43) of Bili respondents’ comparative lack of consensus and informant ‘knowledge’ levels, as quantified in the cultural consensus analysis (see Love and Ross 2006 for more details). In light of such factors, it is not surprising that external solutions are favoured by people in Bili.

Recognition of this inter-community difference, especially in relation to ‘solutions’, is a substantial acknowledgment. Deferral towards Church and government as preferred mediators and management implementers of solutions in Bili has significant implications for resource management aspirations. Resource management initiatives must take the reality of intra-cultural variation into consideration and avoid oversimplified and ‘neat’ essentialist socio-cultural generalisations; although I acknowledge the critique that ‘intra-cultural variation’ can be just another ‘neat category’ itself (Wolfram Dressler, anthropologist, *pers. comm.* 2005). Nonetheless, all too often difference is only identified in overt terms, such as in relation to religious denomination (eg. Juvik 1993), and researchers and practitioners overlook the complex milieu of localised historical and other incremental intra-cultural differences. Understanding difference *and* similarity, combined with the ability to recognise cultural ‘boundaries’, is essential to developing effective resource management strategies (Aswani 1997b; see also Nazarea *et al.* 1998, *c/f.* Marlor *et al.* 1999). This affirmation acknowledges that the idealised management model of ‘replication’ is not always suitable: The community directed approach favoured by respondents in Chea is certainly not appropriate in Bili (at the moment based on people’s current perspectives).

### **Flexible Strategies and Contextual Solutions**

Integral to any discussion of ‘solutions’ is an analysis of how local management regimes may react to environmental change. Just as CMT has arguably shown resounding ‘contextual flexibility’ in the face of external economic and political pressures (Hviding 1998; *c/f.* Aswani 1997b:9-10), the same characteristic socio-political dynamism may also adjust to environmental change. When explicitly asked about the role of the chief in managing fisheries, the clear majority of people answered in the affirmative that, ‘Fishing would be better if the chiefs controlled it’ (see Table 4.12). This is connected to local cultural and historical continuities associated with ‘traditional’ CMT issues (see Hviding 1996:chpt. 7). Interestingly however, the chief was only cited (unprompted) in two instances in relation to the broader, generic context of ‘problems’ and ‘solutions’. While the sample is too small to make conclusive statements, this may infer that while people still make appeals towards the chief in the domain of fishery issues, when dealing with ‘modern’ environmental problems (eg. increased sediment and nutrient inputs, coral bleaching and algal blooms) people may be more willing to openly draw upon different sets of ontological premises. This potentially leaves room for wider sets of responses and management options. Concomitant with the fact that many chiefs are losing the respect of their communities and no longer reside in the

village, this insight may represent opportunities where productive extra-local partnerships can be formed that concentrate on **specific issues**, rather on whole **ecosystem approaches**.

This less-is-more idea has recently emerged in an assessment of local marine management programs in Vanuatu. Longitudinal case studies of 21 village conservation programs has revealed that those programs that initially focused on a single species (eg. trochus or turtles) and/or a single issues (eg. restricting night time spear-fishing) have proven to be more effective in enhancing village awareness and encouraging effective local-level management initiatives than when total coastal resource management approaches were targeted (UNESCO 2004). This is a significant implication as it suggests that the ‘holistic’ ecosystem approach much championed by scientists and conservationists, including the projects under investigation here, may not necessarily be the most suitable discourse or management medium in some contexts. This is a domain worthy of further research in the future.

The above discussion has highlighted a number of cultural and epistemological factors connected with the conceptual categories of ‘problem’ and ‘solution’, and demonstrated how these numerous ‘variables’ or factors impact on resource management aspirations in the context of Marovo Lagoon. It is now pertinent to focus the discussion on the notion of ‘process’.

## THE PROCESS

*If you can't describe what you are doing as a process, you don't know what you're doing*

(W. Edwards Deming 1900-1993)

*Forget goals. Value the process*

(Jim Bouton)

The final segment of this discussion is concerned with the key ‘processes’ undertaken by the various projects in their guise as ‘agents of change’. Particular attention is paid to exploring the ways that projects understand and view environmental change, and the manner(s) in which their organisational and philosophical frameworks dictate the scope of their actions/responses – subsumed here under the rubric of ‘**projectised epistemologies**’.

A brief examination of the ‘factors of success’ indicators that were cross-tabulated with the communities and projects in Chapter 4 (Table 4.14 and 4.15), shows that relative to the aggregate indicators identified in the literature, the villages and projects do not meet many of the criteria. Nonetheless, Chea and IWP meet more of the indicators than do Bili and Seacology; a judgment backed-up by my results which showed more general awareness of

IWPs MPAs than Seacology's, and less intra-community consensus in Bili relative to Chea. While the indicators provide a quick and broad purview of the case studies, such check-lists also mask and ignore important issues. For example, while IWP has a formal participatory aspect to their project, in practice this was insignificant (see below). On paper this counts as a positive, but in reality it proved to be a hollow exercise. To explore these processual issues further, it is pertinent to turn to a broader and more nuanced 'tool' of exploration.

### **'Closed' and 'Open' Systems - Directive and Adaptive Processes**

In a 'systems' approach to exploring environmental change and management interventions, Lemon and Seaton (1999) undertake what they call 'policy relevant research' by focusing on the **processes** of change, rather than merely seeking to identify simple causal relations (1999:1-16). Using their template, the assumptions, decision-issues and actions characteristic of the projects under investigation here would be viewed as part of the 'traditional', rationalist program in that they select an issue (or issues), identify the cause of the issue(s) and then develop policy and/or take actions to mitigate/change the issue based on the identification of this causal relationship.

There is a place for 'rational', end-state planning processes, such as infrastructure design and implementation (Lemon and Seaton 1999:7). However, in relation to strategic decision issues (of which resource management is a part) such linear, deterministic approaches are inadequate as they do not correspond with the messy, dynamic and complicated nature of the real world (Checkland *in* Lemon and Seaton 1999:6; see also Byrne 1998). All 'real world' interactions frequently result in 'unintended' consequences, which in turn become part of a new set of 'unanticipated' decision-issues (Lemon and Seaton 1999). The dynamic interface between environmental change and human behaviour is perhaps the pinnacle of such complexity. From these interactions emerge issues which end-state planning - elsewhere referred to as 'directive' or 'blueprint' planning (Honadle and Rosengard 1983) - simply cannot satisfactorily engage.

In 'closed-system' contexts, errors are generally assumed to reflect poor preparation or implementation, in contrast to 'open-system' approaches where mistakes are recognised as inevitable consequences essential to learning that can point the way forward (Honadle and Rosengard 1983). This latter, dynamic perspective is one of the primary characteristics of what has come to be termed 'adaptive management' (see Margoluis and Salafsky (eds) 1998; Salafsky and Margoluis 1999; Salafsky, Margoluis and Redford nd.). The learning

framework utilised by the LMMA Network (Chapter 3) is built upon this ‘adaptive management’ paradigm (eg. LMMA Network 2003).

The case studies in this thesis, especially IWP and Seacology, can be heuristically characterised as representative of ‘technical/closed’ approaches by dint of their linear, deterministic and directive design, and the acute epistemological presumption of **homogeneity** that underpins most facets of their approach. As Lemon and Seaton (1999) elucidate:

Invariably the structures and procedures in place to manage change are based upon end state planning and an inability to respond, or even recognise, the complexity of the process. This ‘closing’ of the system in order to match it to formal management structures and practice invariably fails to account for the informal responses and interactions that form the basis of self organisation (Lemon and Seaton 1999:6).

To elaborate on some of the applied consequences and limitations of a ‘closed-system’ approach, the following section provides some instructive examples from the case studies under investigation.

### **Islands of Homogeneity (in a sea of Heterogeneity)? Flawed assumptions**

Lemon and Seaton (1999) identify three main ‘assumptions of homogeneity’ as characteristic of closed-system approaches: the presupposition that the symptoms of a problem are linked to **single decision issues** (eg. overfishing); that there is a **single homogeneous audience** for change (the ‘problem owners’, eg. Chea and Bili community); and the **problem setting** can be well bounded (i.e. there is no or little interaction between it and anything else) (Lemon and Seaton 1999:6). The single decision issue of ‘overfishing’ has been exposed as not necessarily incorrect, but overly simplistic in that the causal factors often associated with overfishing (‘monetisation’ and ‘population growth’) mask a host of other contributing factors. The second factor, the presumption that a homogenous audience (‘problem owners’) exists has likewise been shown to be flawed, with significant intra-cultural difference in evidence between the respondents in Bili and Chea. Factor three is the supposition that the problem domain is well bounded and there is no/or minimal interaction between it and anything else, and homogenous **responses** to the actions of the intervention are likely (Lemon and Seaton 1999): this is perhaps the biggest flaw of all.

While the MPA literature increasingly documents the varieties of local responses associated with the human dimension (read ‘problems’) of MPA projects, their primary purpose is to

develop ways to circumvent these challenges (eg. Lundquist and Granek 2005). There are no alternatives: MPAs are still the inflexible end-game objective. If homogenous responses are not forthcoming, then there are various proscriptions on offer for dealing with these human 'barriers' to increasing compliance, either through improving enforcement mechanisms or, less often, through incentive strategies. The owners of the resource in question are discursively turned into 'poachers' and 'encroachers' in their own territory (Hviding and Bayliss-Smith 2000:322). 'Participation' is the 'tool' often used to reduce resistance and increase compliance, but in reality is all too often a means of coercion and project legitimisation as much as it is a method of inclusion and empowerment (see contributors to Cooke and Kothari (2001)). Numerous informants stated that the IWP community committees were selective, ineffectual and tokenistic (eg. informant A3, *interview*), and a 'lack of proper community consolation' was cited as one of the reasons for the ineffectiveness of both the IWP and Seacology MPAs (Table 4.16). To trace the consequences that these and other project processes have, I close the discussion with some instructive examples using the anthropological prism of 'counter-tendencies' (Arce and Long 2000).

In anthropological parlance, aspects of the unplanned changes and unintended consequences (Lemon and Seaton 1999) that often arise from such directive interventions, can be explored through the optic of 'counter-tendencies' (Arce and Long 2000). Counter-tendencies refers to how localised practises are part of an ongoing process of reworking 'modernity' from within, where material, cultural, organisational and human configurations coexist, clash, mix, separate and/or retreat (Arce and Long 2001:13). Most pertinent to this investigation, the values and practices of outside agents/agencies become repositioned and re-constituted, transforming existing 'localised' situations, cultural boundaries and knowledge(s) into something else altogether (Arce and Long 2001). These reconfigurations are almost always unanticipated and unplanned. Several connected, yet separate, illustrative examples follow.

### **Fishing for Projects: *Wantokism* and project beneficiaries**

An understanding of the origins of the projects 'explains' some of the complications and challenges they have so far endured. In all instances, the majority of 'problem owners' and supposed 'project beneficiaries' had nothing to do with either the **selection** or **development** of the projects: The UQ-Project was instigated by an expatriate who is married into Marovo, while the IWP and Seacology projects were 'attracted' to the region through the actions of Marovo Solomon Islanders residing elsewhere. In IWP's case, although the selection process included numerous mechanisms aimed at limiting political, staff and *wantok* interference and

biases (Kinch *et al.* 2005b:8; see also IWP 2002), there is suspicion of manipulation as the wife of the original country co-ordinator is from Bili village. Later, this same national co-ordinator was sacked due to the alleged misappropriation of significant amounts of project funds. Legal charges are pending but, in ‘Melanesian style’, this individual is currently working in a major government department.

This brief vignette has two main points of interest. First, although the project staff of IWP are Solomon Islanders and the Seacology project was invited into the community by a ‘local’, the projects are not ‘home grown’ and for all intents and purposes are **external** interventions. Although there was a national three-month-wide media campaign by the Solomon Islands Broadcasting Corporation (Kinch *et al.* 2005b:8), many locals were surprised to hear that their village had solicited an ‘expression of interest’, let alone won the site selection process (informant B6, 2005). This is even truer for Seacology (Love and Ross 2006:45).

My second point is less concerned with pragmatic explanations and more interested in wider socio-cultural interpretations of these actions. Gooberman-Hill (1999) argues that not only do Solomon Island urbanites enjoy more affluence in Honiara, but the city also provides a relative freedom from the demands, obligations and values of ethnicity, kinship and *kastom* associated with village life - a perception summed up by the Pijin phrase ‘*fil free*’ (‘to feel free’) (Gooberman-Hill 1995). Jourdan (2002) additionally notes that many urbanites are reluctant to return to their villages and claim their rights to reciprocity, as they are obliged to bring gifts (2002:257). The manipulation of the selection process in the IWP example, and the impetus to direct projects actively to one’s home village in the Seacology case, are classic examples of so-called ‘urban elites’ harnessing and reformulating *wantokism* to suit contemporary contexts. Using location, education and their connections with the outside world (access to NGOs), these individuals have found a novel way to meet their reciprocal obligations via proxy – without having to spend money or expend their hospitality.

A further contributing factor at play here is connected with the Big-Man ‘issue’. While it is true that power structures in Marovo more closely resembles the Polynesian chiefly system than the Big-Man system extant throughout much of Melanesia (see Hviding 1996:88; and chapter 2), the dissemination of the Pijin discourse(s) of *kago* (cargo, goods) and *bikman* (Big-Man), combined with the ubiquitous nature of the Westminster political process have arguably resulted in the Big-Man ‘mentality’ penetrating more segments of the populace than ever before. In Big-Man systems, leadership and prestige is acquired through effort rather than ascribed at birth. In such contexts power is about **interpersonal relations** (Sahlins

1963:289). Kabutaulaka (1998) notes that in contemporary Solomon Islands there is a new type of Big-Man or chief emerging, with individuals gaining status and popularity through their involvement in new institutions such as the church (Kabutaulaka 1998:29). The harnessing of NGO project funds and activities is a less acute, but nonetheless further objectification, of this same trend.

These actions have had numerous unanticipated consequences for the MPAs. The most destructive outcome has been that the segments of the community not closely related to the families responsible for ‘catching’ the project feel less included. This is true in terms of committee and workshop representation in relation to IWP (informant A3, *interview*), and access to *kago* generally (a criticism also valid in regards to the UQ-Project). For example, in Bili a member of the extended family responsible for ‘attracting’ the IWP project to the village appropriated a UHF radio and took ‘control’ (possession) of the project boat; property intended for community and project usage only. In another instance, the chainsaw brought by Seacology funds to help with the construction of the school building and intended as ‘community’ property was likewise ‘taken’ by a well connected family member (informant A3, *interview*). These actions inevitably lead to exclusion, alienation and jealousy. In Marovo jealousy (*kuhe*) is a strong and motivating emotion, and the phrase ‘*choga pa kavo kuhe*’ (lit. ‘jump in the river of jealousy’) is an oft remarked axiom (amongst young males in particular). Those not close *wantok* to the project ‘middlemen’ subsequently feel jealous of the benefits ascribed to some, and not others, in the community. These individuals are the ones most inclined not to respect the project’s objectives out of a sense of exclusion, defiance and anger (*pers. observation*; numerous interviews). This constitutes an interesting embodiment of unintended, project inspired ‘counter-tendencies’, and is just one of a myriad of potential examples that demonstrates the complexities, subtleties and plethora of ‘variables’ that resource management initiatives must deal with. Understanding socio-cultural particulars such as these are integral to understanding, and potentially circumventing such eventualities. For example, if Seacology had made more of an effort to make sure that their ‘message’ was heard, and not presumed that the ‘homogenous community’ would all be informed and support the MPA covenant, some of these issues might have been tempered.

## CONCLUSION

In my view, the issues raised in this discussion points to **accountability** as one of the core problems with project-community interactions. Currently, a projects primary responsibility lies with funding agencies and not with local people - the actual ‘problem owners’. Projects

are not accountable to the communities in any significant way. Accountability has been conflated with accountancy (MacIntyre 2005:137) and real accountability, like genuine ‘participation’, remains elusive. In today’s economic climate, funding insecurity puts enormous pressure on conservation projects to gather information and/or undertake research and implement programs that have promotional value within the competitive realm of funding prerogatives (eg. biodiversity) (Wagner 2005:100). Such research topics and actions are not necessarily those most pertinent to local interests.

The manners in which local reconfigurations of *wantokism*, developmental aspirations and projectised epistemologies have collided in these case studies pays testimony to the complexity of the issues associated with MPAs. Scientific debates about fish biomass and larval dispersal, let alone check-list ‘factors of success’, seem a long way from the coal face of applied marine conservation. If one thing stands out above all others, it is that homogenic assumptions and directive approaches are a hindrance, rather than a help, in such contexts. Personally, I am not **against** MPAs *per se*, and I disagree with the polemic and outright dismissal of the ability of MPAs to work within Melanesian contexts where customary marine tenure exists (eg. Foale and Manele 2003). What I am critical of is the processes often associated with the ways in which many MPAs are implemented. I am concerned that the uncritical valorisation of MPAs risks delegating them to a one-size-fits-all solution that is a band-aid-approach that can hardly stop the bleeding, let alone heal the wound. If MPAs constitute the final end-game, rather than merely being a starting point, they will inevitably fail to meet their overall objective of mitigating marine degradation in the long-run. If one agrees that the problem is, at its core economic and political, than accountability at the national and international level must start at the project level.

In the final chapter (Chapter 6), I elaborate on these and other insights, reiterate some of the main findings and make some preliminary remarks about the applicability of MPAs in the context of Marovo Lagoon.

## CHAPTER 6: CONCLUSION

The ubiquitous implementation of MPAs around the globe is testimony to the optimism that resource managers have regarding their potential to help mitigate marine degradation. However, as demonstrated in the literature and in the case studies under investigation here, this confidence is not fully warranted. Nonetheless, regardless of the critical tone of this thesis, I am not **against** MPAs *per se*. Further, I disagree with the polemic and generic dismissal of the ability of MPAs to work within Melanesian contexts where customary marine tenures that have identical aims to MPAs exist (eg. Foale and Manele 2005). It is simply too early to tell whether or not the ‘middle-up/middle-down’ approach characterised by Shankar Aswani’s work in Roviana and Vonavona Lagoons, and the LMMA Network’s various Pacific-wide programs, will have sustained results in the long-term. Throwing out the baby-with the bathwater by dismissing MPAs altogether is a knee-jerk reaction reminiscent of the homogenic assumptions this thesis has aggressively critiqued.

What I am critical of are the **processes** associated with the ways in which many MPAs are implemented - not the concept itself. I am also concerned that the sheer abundance of ‘paper MPAs’ and their ever-increasing popularity may, through over-exposure and short-term, half-hearted attempts, undermine the potential of MPAs to be a viable component of marine management systems in the long-term (as per Agardy’s *et al* 2004 concerns). The uncritical valorisation of MPAs risk relegating them into a one-size-fits-all solution that is a band-aid solution which can hardly stop the bleeding, let alone heal the wound. If MPAs remain the final end-game, rather than merely being a starting point for local and extra-local complementary measures, they will inevitably fail to meet their overall objective. As noted, MPAs can all too easily turn the supposed ‘project-beneficiaries’ into ‘poachers’ and ‘encroachers’ in their own territory (Hviding and Bayliss-Smith 2000:322).

In this thesis, I have demonstrated that one of the reasons for the failures associated with some MPAs is the projectised epistemologies which their advocates use to understand the issues. This is characterised by monolithic, simplistic and homogenic understandings of the ‘decision-issue’ (i.e. overfishing), the ‘problem setting’ (i.e. contained environmental domains) and the ‘problem owners’ (i.e. community homogeneity). Such closed-system/directive approaches, with their neat, linear cause-effect relationships are all too easily sabotaged by the inevitable unanticipated consequences associated with the messy,

heterogenous nature of reality. It is little wonder that projects that promote the MPA 'solution' are yet to receive community sanction.

Generic calls regarding project-community equity seem hollow today as they are no longer new. Regardless, village-based decision making **must** be the foundation of resource management hopes. Support is contingent upon a complex suite of factors, and without local ownership of the issue(s) failure is certain. The middle-ground approach advocated by Aswani (1997b) and Jones (2002) is potentially the way forward in regards to externally driven conservation programs, but these require long-term funding commitments and logistical support; this is not something easily forthcoming within the competitive world of conservation funding. Regardless, the intra-cultural diversity evident in the case studies investigated here demonstrates that no standard, easily replicable 'model' is going to be the answer. There is a continuum of needs and responses, with some communities capable of steering their own destiny with no or minimal outside support at one end, opportunities for collaborative partnerships with local and/or extra-local NGOs and government agencies in the middle, through to more externally led, directive projects at the other end. However, with regards to this last category, superficial recourse to cultural continuities such as 'traditional' reef-closures is not a *carte blanche* invitation to apply 'top-down', directive management strategies without community support. Further, community engagement cannot consist merely of 'consultation', let alone coercive processes that actually constitute 'participation as legitimisation', in order to galvanise local support.

### **In Consideration of MPAs in Marovo Lagoon: Implications of Research**

In addition to the more academic and abstract exploration of the pitfalls of projectised epistemologies and the unintended consequences associated with their actions, my research has highlighted a number of local epistemological factors, and broad insights generally, which are pertinent to marine conservation aspirations in the Marovo context. Below is a summarised reiteration of some of the key issues I consider relevant to the task of identifying practical resource management issues. The list is far from exhaustive and it does not constitute any form of normative 'indices of success'. Rather, they are simply domains of interest that deserve further inquiry and/or at least due consideration by those attempting to develop management strategies in the context of Marovo Lagoon; regardless of whether they be local or extra-local in origin.

- **Shifting Baselines:** Perceptions of environmental change have a significant impact on conservation aspirations. With such a young population and changing levels of local knowledge, consensus regarding the **kind** and **degree** of the ‘problem’ is difficult to ascertain, especially before overt ‘crisis levels’ of degradation have arrived.
- **Fluid Epistemologies:** Local epistemology favours experiential learning and it is only through repeated verification of ‘seeing for oneself’ (*omia*) that people are likely to reach mutual conclusions about the degree of the ‘problem’ (environmental change) (Hviding 1996b).

Combined, these two observations highlight the limitations of ‘book-learning’ as a primary educational medium. A productive addition to any resource management program may be exchange programs whereby selected (but representative – male/female, young/old) members of a community undertake a regional, national or international fieldtrip. People could observe first-hand the status of other similar (but more degraded) environments and what people are doing in other contexts to redress the issue(s).

- **Different Agendas:** Local concerns are not of the same type or degree as those of extra-local concerns. ‘Protecting biodiversity’ does not resonate with local utilitarian concerns. Nonetheless, superficially dressing-up conservation programs to appear to be functionalist in orientation (i.e. ‘selling’ the fisheries benefits of ‘no-take’ MPAs) may not be productive as it may undermine conservation in the long-term.
- **Decision-Issues:** Identifying ‘overfishing’ as the primary causal factor of marine degradation, while it may be correct, can mask a host of other important factors and make scapegoats of the locals. In effect, this can take attention away from other potentially more destructive factors, such as global warming, logging, bait-fishing, the LRRFT, etc.

These points do not necessarily suggest that strategies aimed at reducing fishing effort are flawed, rather that they are only one part of the solution. While an evident statement recognised by most (eg. ICZMPs), the sheer volume of attention being paid to MPAs suggests that many conservation organisations may be simply ‘jumping-on-the-bandwagon’ and uncritically diverting attention away from other broader but equally important issues.

- **Flexible Strategies:** People may draw on different assumptions and responses when dealing with different environmental issues. The allocation of fisheries resources is

squarely situated within socio-historical ('traditional') trajectories, and thus may be best managed using locally driven (and derived) tools. However, 'modern' problems may create room for more adaptive, less conservative responses.

- **Less-is-More:** Affiliated with the above topic is the fisheries management strategy based on sanctions against just a **single species** or (as above) a **single issue**, rather than favoured comprehensive 'no-take' MPA.

These combined points suggest that the ecosystem approach valorised by 'western' science and conservation agencies as **the** 'new paradigm' may not be the most viable or pertinent discourse and tool in some contexts. In the case of the first point, **specific issues**, such as mangrove clearing, sediment run-off (i.e. garden plots located on the side of hills) and sanitary issues such as human waste are examples where people may be more open to constructive partnerships with outside agents. In these cases, programs may also be able to involve a more representative cast of characters (women, backsliders, youth) than when dealing with 'traditional' fisheries issues where a congealed power structure and decision-issue protocol is already extant. In the final case, longitudinal case studies from Vanuatu have suggested that concentrating on one species (ideally starting with a fast growing animal such as trochus), or one issues (spear fishing at night), was more successful than when comprehensive, coastal management approaches were initially trailed (UNESCO 2004; see also Aswani and Weiant 2004). This demonstrates that practitioners must remain open minded and prepare to disregard previously established axioms.

### **Future Research**

Building on the insights developed in this thesis I suggest several avenues for further research. From a **project perspective**, a comprehensive overview of MPA focused agencies could further qualify the kinds of epistemological biases extant in MPA management ontology. What background (geopolitical, national), experiential and educational factors are in evidence? What differences are there between NGO and governmental approaches to MPAs? In terms of **intra-cultural variance**: How do perceptions of MPAs and marine resources differ in terms of age, gender, education, etc.? How might these vary through time and across space? Building on Aswani's (2000) recognition that hands-on involvement in **scientific monitoring** increases community ownership, what kinds of scientific processes are most suited to such exercises, what barriers and other opportunities does 'community monitoring' proffer, and importantly what limitations and problems do such approaches harbour? Most indicators of success are related to the conservation objectives of MPAs.

Although people have begun to explore the different ways that local people **value** and perceive MPA success (eg. Dahl-Tacconi 2005), there is certainly room for exploring the question: How do people value MPAs and why? Further, how does value change in instances where MPAs have been established for some time? What methods are most pertinent for this? How pertinent might cultural consensus analysis be in meeting this objective? In terms of **conflict** related issues: What kinds of local conflict mechanisms do people use already, and how might these be used in the context of MPA disputes? Finally, in direct relation to the Solomons, using Hviding's (1989; 1996) work as a 'cultural baseline' of sorts: How has customary marine tenure rights and issues altered since he conducted most of his field-work? Is CMT as flexible and congealed today as he implied in the past? How are such CMT regimes affected in places where MPAs have been established (i.e. Roviana Lagoon)? Once these research questions have been addressed we will have a much better idea of the place and role of MPAs in the management arsenal of both project managers and local resource owners.

In conclusion, MPAs **are** an important management tool in the fight against marine degradation, but they are only one of a bundle of solutions. As I have demonstrated in this thesis, the top-down imposition of any management regime that is not supported by the local constituents is doomed to failure, no matter how successful the technique or model is in theory. My research in Marovo Lagoon, coupled with future research undertaken at a wider regional scale, can be used to inform a multiplicity of approaches to marine management. There is no single 'solution' to a multi-faceted 'problem'. However, an accountable 'process' that ensures a two-way exchange of knowledge and responsibility, and which guarantees due attention and agency is given to local perspectives of the decision-issue(s), is likely to enhance, rather than divide, local support. With an eye on 'process' rather than the horizon, a less bumpy-ride along the 'pathway of change' is possible, contributing towards a legacy of capacity through action, regardless of the end-state objective.

## APPENDIX 1A: (CAQ) Cultural Consensus Questionnaire (English version)

### CQ: Consensus Questionnaire

To each of the following statements, could you please answer *true* or *false*:

	Questions	True	False
1	If there were no <i>petupetuani</i> (mangroves) there would be no fish to catch		
2	There will be enough fish for us in 10 years time		
3	There are as many giant clams ( <i>ose</i> ) left in the lagoon as before		
4	Seagrass ( <i>kulikuliani</i> ) have little value to people		
5	Fishing should be restricted in some areas		
6	There is more <i>ero</i> ( <i>lumluntui</i> ) than before		
7	MPAs will increase the amount of fish in the lagoon		
8	Logging is important for the national economy		
9	People no longer respect ( <i>kinagata</i> ) the old ways ( <i>kastom</i> )		
10	<i>Voa legudi</i> (dead tabular coral) are increasing in numbers		
11	Fishing would be better if the Chiefs controlled it		
12	BDM ( <i>puhaka</i> ) are only important as a source of income?		
13	The government should control fishing		
14*	Algae ( <i>lumluntui</i> ) has not increased over the last 10 years		
15	Only some village people benefit from tourism		
16	There are not as many fish in the lagoon now as there was 10 years ago		
17	If there is more <i>lumluntui</i> there will be fewer fish		
18	People who fish in restricted areas and break rules should be punished		
19	Some <i>iduka</i> have changed colour and become white		
20	Life is better now than it was 10 years ago		
21	Conserving the lagoon will help me make more money		
22	There will always be enough wood for us to do wood-carving		
23	The Church should control fishing		
24	People respect the MPAS		
25*	Some sand ( <i>keoro</i> ) have not turned from white to black		
26	The money from logging and bait fishing is very important for the country		
27	People from neighbouring villages do not have to ask permission ( <i>vari tepa</i> ) to fish in our (area) <i>puava</i>		
28	There will always be enough fish in the lagoon to feed me and my family		
29	Logging is spoiling the lagoon		
30	Tourism is good for the people of Marovo Lagoon		
31	There is more algae ( <i>lumluntui</i> ) now that the water is dirtier		
32	Life is better in Honiara than in the village		
33	Some of the reefs ( <i>saghauru</i> ) are dying		
34	There is less <i>tatalo</i> (alga – <i>Halimeda sp.</i> ) than before		
35	Life will be better for us in 10 years than it is now		
36	There are too many 'western' groups coming and telling us what we should do		
37	There are more <i>chichi oreke</i> (soft corals) now than 10 years ago		
38	Mangroves ( <i>petupetuaini</i> ) are important for fish		
39*	There are as many different coloured <i>iduka</i> as there has always been		
40*	If the reefs ( <i>saghauru</i> ) die, it will not have much effect on the fish		
41	Conserving the lagoon is only useful if there are money for 'development' and 'jobs'		
42	We need more MPAs		
43	Teaching children <i>kastom</i> knowledge is more important than learning to speak good English		
44	The church should be more involved in decisions about fishing		
45	If there are no big fish, there will be fewer fish in the lagoon in the future		
46	There is as much <i>binubinuani</i> as before		
47	If people received more money per kilo in esky fishing, they wouldn't need to catch as many fish		
48	People do not eat more parrotfish ( <i>topa</i> ) than before		
49	If there is more <i>lumluntui</i> there will be more fish		
50	<i>Buki</i> (Triton trumpet shell) eat <i>taberaru</i> (Crown of thorns star fish)		
51	<i>Idere</i> (sea) is as clear as it use to be		

\* Signifies statements which were removed from the final analysis.

## APPENDIX 1A: (CAQ) Cultural Consensus Questionnaire (Marovo version)

<b>CQ: Consensus Questionnaire (MAROVO LANGUAGE)</b>			
	<b>Ninasa</b>	<b>True</b>	<b>False</b>
1	Pula kare katonga petupetuiani, ngina kare katonga ihana		
2	Ngina korapa isiri ngana ihana tahita pa (10) burburu di maera		
3	Meka tonu ngana sinoku ta ose pa hua oro pa ukala puko pa lagoon		
4	Kani arilaena via ta hita tinoni kulikuliani		
5	Chinaba ieni isiri pata tava hope pa katiga vasina (saghuru)		
6	Soku via ero (lumlumtue) pahua mani lapa tuari		
7	MPAs (Marine Protected Areas) ieni vakelina sinoku ta ihana		
8	Logging ieni arilaena via pa economy tahita		
9	Kani va boka ia tinoni pahua kasitomu ta hita		
10	Keli mae sinoku ta idaka voa legudi		
11	Ngina leana ngana chinaba pula va tiva tinarae chief (palabutu)		
12	Puhaka ieni arilaena puna tavae poata		
13	Ginavuna isiri va jama nina chinaba		
14	Kani keli sinoku ta lumlumtue ukala (10) buruburu di la pira		
15	Katiga tinoni ngana pa palavanua ta toka nia tourism		
16	Kani soku via hua pa tuari ihana pa kogu pahua mani la pa (10) buruburu la pira		
17	Pula soku via lumlumtui, kani soku ngina ihana		
18	Tinoni pu chaba pa vasina putava hope, mani kuri tinarae ieni ngina tavala vina kilasa		
19	Katiga idaka soa kala mani havaro heva		
20	Leana via kino pahua, mani la ka io buruburu dilapira		
21	Pula chakei nia ra kogu ieni tinoka nigu ra pata vae vasoku poata (seleni)		
22	Ngina korapa isiri ngana hae pata tavete kavingi		
23	Isri pata Church veko nia tinarae chinaba		
24	Chake nia tinoni MPAs (Marine Protected Areas)		
25	Katiga keoro kadi soa korapa heva ngana, kadi chinoko		
26	Poata pa dekuru oro poata pa mujiki ieni arilaena via pa Solomon Islands		
27	Ria talada hita pa katiga palavanua, kadi isiri pata tepa, mani mae chaba pa vasina tahita		
28	Ngina meka tonu nga sinoku ta ihana, pa kogu pia, pata ngoe ra oro family tagura		
29	Logging ieni regochona lagoon		
30	Tourism ieni leana via ta tinoni pa Marovo Lagoon		
31	Soku via Lumlumtue boru ieni nije via nia kavo/ karaka		
32	Kino pa Honiara ieni leana via mani lapa palavanua		
33	Katiga saghuru iedi legu		
34	Kadi soku ngana tatalo pua manila pa tuari		
35	Ngina leana kino tahita pa (10) buruburu maera mani lapa hua		
36	Soku via group tinoni kore heva mae, madi totove nia sa peda tonua hita		
37	Soku via chichioreke pahua mani la iepa (10) buruburu di ukala la pira		
38	Petupetuani ieni arilaena via ta ihana		
39	Soku ngavulu hokiti kaladi ria idaka pu hua nga inomidi ria ro		
40	Pula legu ria saghuru, kani hara chie via nia ngina ihana		
41	Chinakei nina kogu ieni ngina arilaena, pula ko poata pata ta tonu 'development' oro ria na tinavete		
42	Sokudi ria MPAs (Marine Protected Areas) hiva ni hita		
43	Va teteini ni inatei kasitomu hita ria koburu, ieni arilaena via mani la inatei nina pata jama valeana nina English		
44	Church ieni isiri uka pata raku pa vina Jamanina decision pa chinaba		
45	Pula huana pacho ihana gete, ngina kadi soku ngana ria ihana pe ko pakorapa kogu pana maena		
46	Korapa meka tonu ngana sinoku ta binubinuani pahua oro pa tuari		
47	Pula vae vasoku via nia poata tinoni vinata holu pa kilo pa esky, ngina hiva via nia ria pata be vae vasoku ihana		
48	Kani ngo via topa tinoni pahua, mani lapa meka rane		
49	Pula soku via lumlumtue, ngina soku ihana		
50	Buki ieni ngo taberaru		
51	Linumocho ta idere eni meka tonu ngana		



.....  
 14. What are the main garden crops you sell?  
 .....  
 .....

**F: Fishing/Marine related activities**

15. a) How many times last week did your household eat fresh fish? 1 ; 2 ; 3 ; 4 ; 5 ; 6 ; 7   
 b) What kind of fish were they?.....  
 .....

16. Who in your household fishes? Please list the activities of each person, where and how frequently they fish (for location give name of fishing ground – and use map)

a) Does anyone in this family currently dive, or use to dive, for beche-de-mer (*puhaka*)? Yes  No  Use to   
 Who?.....

b) Are you, or anyone in the family, currently involved, or use to be involved, in the esky fish trade? Yes  No  Use to   
 Who?.....

Name	Main Fishing Activity	Frequency (total trips per week)	Hours (per day)	Location	Technique
	Subsistence (kaikai)				
	Esky				
	Beche-de-mer ( <i>Puhaka</i> )				
	Market				
	Trochus ( <i>Bikoho</i> )				
	Kastom \$ ( <i>Poata Mala</i> )				
	Subsistence (kaikai)				
	Esky				
	Beche-de-mer ( <i>Puhaka</i> )				
	Market				
	Trochus ( <i>Bikoho</i> )				
	Kastom \$ ( <i>Poata Mala</i> )				
	Subsistence (kaikai)				
	Esky				
	Beche-de-mer ( <i>Puhaka</i> )				
	Market				
	Trochus ( <i>Bikoho</i> )				
	Kastom \$ ( <i>Poata Mala</i> )				
	Subsistence (kaikai)				
	Esky				
	Beche-de-mer ( <i>Puhaka</i> )				
	Market				
	Trochus ( <i>Bikoho</i> )				
	Kastom \$ ( <i>Poata Mala</i> )				

\* *tope ihana* – Spear fishing (1); *karu karumae* – Trolling (2); *vahorehore* – Handline fishing (3); *dukolopete* – Hook & bait w/rock (4); *uiruru* – Handline no sinker (5); *kurakura* – Stone & hook (6); Other (specify) (7)

NOTES:.....  
 .....

17. Has there been any change in the locations used for fishing over the past 10 years? Yes  No   
 (If so) Describe the change and reasons why locations are changing (*use map if appropriate*):  
 .....  
 .....

**FC: Fish Catch/Preference & Change**

18. *Freelist*: Can you please list the ten most frequently caught fish by members of this household?

1. ....	6. ....
2. ....	7. ....
3. ....	8. ....
4. ....	9. ....
5. ....	10. ....

19. Are these the same fish you were catching 10 or 20 years before? (Tick) 10  20  Yes  No   
 (If not) What has changed? Can you please list which species you no longer catch as frequently or at all?

1. ....	6. ....
2. ....	7. ....
3. ....	8. ....
4. ....	9. ....
5. ....	10. ....

20. Preference: What are your most favourite fish to eat? (*mamsivia*)

1. ....	6. ....
2. ....	7. ....
3. ....	8. ....
4. ....	9. ....
5. ....	10. ....

21. Are more people fishing today than before? Yes  No   
 Explain:.....  
 .....  
 .....

**I: Income**

22. What are your main sources of income, in order of importance? (*Ranking w/ card sort*)

1. ....	6. ....
2. ....	7. ....
3. ....	8. ....
4. ....	9. ....
5. ....	10. ....

**AP: Attitudes & Perceptions**

23. How would you describe the catches of marine resources (fish & beche-de-mer) by this household over the past year?

<input type="checkbox"/> Very bad	<input type="checkbox"/> Bad	<input type="checkbox"/> OK	<input type="checkbox"/> Good	<input type="checkbox"/> Very Good
-----------------------------------	------------------------------	-----------------------------	-------------------------------	------------------------------------

Explain/Comments.....  
 .....  
 .....

24. How would you describe the catches 10 years ago?

<input type="checkbox"/> Very bad	<input type="checkbox"/> Bad	<input type="checkbox"/> OK	<input type="checkbox"/> Good	<input type="checkbox"/> Very Good
-----------------------------------	------------------------------	-----------------------------	-------------------------------	------------------------------------

Explain/Comments.....

.....

.....

.....

25. What do you think the catches will be like ten years from now?

<input type="checkbox"/> Very bad	<input type="checkbox"/> Bad	<input type="checkbox"/> OK	<input type="checkbox"/> Good	<input type="checkbox"/> Very Good
-----------------------------------	------------------------------	-----------------------------	-------------------------------	------------------------------------

Explain/Comments.....

.....

.....

26. Are there any problems with fishing and other marine resources (beche-de-mer, shells, clams, seaweed, crabs, and corals) around this village? What problems?

.....

.....

.....

27. In your opinion, has the lagoon changed from how it was in your parents generation?      Yes  No   
(If so) How?

.....

.....

28. How would you describe the current status/condition/health of the following, on a scale from: (5) very good; (4) good; (3) Ok; (2) bad; (1) very bad:

Resource	Rank
Fish ( <i>ihana</i> )	
Beche-de-mer ( <i>puhaka</i> )	
Trochus & Shellfish ( <i>chuko</i> )	
Mangroves ( <i>petupetuani</i> )	
Coral reefs ( <i>sagharu</i> )	
Seagrass beds ( <i>kulikuliani</i> )	
Upland forest regions ( <i>goana Piru</i> )	
Rivers ( <i>kavo</i> )	

29. Are there any fishing practices which you think are having a detrimental impact on fish numbers? (specify if prompted – night diving ; derris root; gill-netting, bait fishing etc.)  :      Yes  No   
(If yes) What? .....

.....

30. In your opinion, what are the main/major threats to Marovo Lagoons ecosystem health?

1. ....	6. ....
2. ....	7. ....
3. ....	8. ....
4. ....	9. ....
5. ....	10. ....

**M: Resource ‘Management’ (Chinakei)**

31. If there are any problems with fishing and with the health of the lagoon, what do you think should be done to improve things?

(a) What should be done?.....

.....

.....

(b) Who should do it?.....

.....

.....

.....	
32. Are you aware of any Government (National and/or Provincial) rules/regulations on fishing in the area? What are they?.....	Yes <input type="checkbox"/> No <input type="checkbox"/>
.....	
33. Are you aware of any MPAs in the local area? (If so) Where are they? Who set them up?.....	Yes <input type="checkbox"/> No <input type="checkbox"/>
.....	
34. Are you aware of any community rules/regulations regarding fishing in the area? (If so) What.....	Yes <input type="checkbox"/> No <input type="checkbox"/>
.....	
35. Do you think these rules are effective? Why/Why not:.....	Yes <input type="checkbox"/> No <input type="checkbox"/>
.....	
36. (Only if MPA mentioned) Do you think people from the community have stopped fishing in the MPAs? (If not) Why not?.....	Yes <input type="checkbox"/> No <input type="checkbox"/>
.....	
37. (If appropriate) Why do you think the MPAs were established? .....	
.....	
<b>BDM: Beche-de-mer (puhaka) (Only if appropriate)</b>	
38. (IF BDM harvesting ceased) Why was/is Beche-de-mer (puhaka) harvesting being stopped? .....	
.....	
39. Do you think the government will lift the ban on BDM in the future? Why/Why not?	Yes <input type="checkbox"/> No <input type="checkbox"/>
.....	
40. Do you think BDM can be harvested to a point where there are none left to catch? Yes <input type="checkbox"/> No <input type="checkbox"/>	
41. a) How important was/is the income from BDM harvesting to you and your family? b) What will you do to replace this income? .....	
.....	
<b>EF: Esky Fishing (Only if involved in esky trade)</b>	
42. How long have you or other family members been involved in the Esky fish trade? .....	
.....	
43. a) What is the most you have ever earned from the esky trade? b) When was this? .....	
44. What could be done to increase your profits from esky fishing? .....	
.....	
<b>CS: Conservation &amp; 'sustainability' (defined)</b>	
45. a) Have you heard of the English terms 'conservation' and 'sustainability'? b) When did you first hear it? Who from?.....	Yes <input type="checkbox"/> No <input type="checkbox"/>
.....	



## APPENDIX 2: Informant Semi-structured Interviews

<b>Code</b>	<b>Gender</b>	<b>Village</b>	<b>Age</b>
Informant A3	Male	Bili	36
Informant B6	Male	Chea	33
Informant D1	Female	Bale	56

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