Local Voices, Local Choices? Vulnerability to Climate Change and Community-Based Adaptation in Rural Vanuatu

By

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ABSTRACT

This thesis focuses on community-based adaptation to climate change (CBA) in a rural, Pacific islands context. It is informed by a case study of Mota Lava, a small island in northern Vanuatu. Climate change poses particular challenges for Pacific island communities, who, in general, are largely natural resource dependent, coastal dwelling and experience high climate variability and extremes. This thesis responds to the lack of critical attention paid to dominant understandings of how to implement adaptation to climate change in a way that best serves the needs of local people. The research addresses the dearth of Pacific local voices in mainstream international adaptation knowledge, therefore contributing to more effective CBA projects and programmes in the region.

The features that distinguish effective CBA are that it: reduces vulnerability; is participatory; is based on local knowledge, needs and priorities, and; empowers communities to help themselves in adapting to climate change. Situated in critical human geography, the study examines mainstream international discourses of vulnerability and adaptation, and the implications of these for effective CBA implementation in a Pacific island community context. Qualitative research drawing from participatory and postcolonial theories provides a platform for community voices in Vanuatu. A combination of semi-structured interviews, unstructured interviews, participatory techniques and participant observation were used to investigate the ways in which people construct their vulnerability and adaptation needs in the community of Mota Lava.

The research revealed tensions between local and mainstream constructions of vulnerability and therefore, adaptation needs. Local people construct vulnerability to climate change as caused by predominantly social factors and processes. Mechanisms for minimising the negative implications of a range of climate stresses and uncertainties are integrated into livelihoods, society and culture. However, this (considerable) adaptive capacity is threatened by aspects of social change stemming from non-local processes of (under)development. Effective CBA requires community-led development initiatives, targeting social processes at the core of increasing community vulnerability. However, in mainstream international discourse, vulnerability to climate change is constructed as being caused by specific climate stimuli, their biophysical impacts and the ability to directly respond to these. As a result, CBA implementation in the region is characterized by technical measures that reactively respond to particular climate impacts rather than proactively reducing vulnerability. The mainstream adaptation discourse limits the effectiveness of CBA for communities like Mota Lava, where the causes of vulnerability are primarily social.

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GLOSSARY

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Table 1 English translation of frequently used Bislama and Mota Lavan language terms

Aelan taro	Varieties of taro endemic to Mota Lava
Bislama	Vanuatu pigin. Bislama is an official national language of Vanuatu, although hundreds of local vernacular languages exist
Bubu bifo	Grandparents and ancestors
Desasta	Disaster. I use *desasta* when I wish to emphasise the ni-Vanuatu cultural construction of the concept which differs from a Western construction
Fuja lukluk	Looking to the future
Kaekae blong hangri	Famine food
Kaekae blong waetman	Western food
Kako	Cargo
Kaon	Account credit owing
Kastom	Ni-Vanuatu traditional culture and knowledge
Kumala	Sweet potato
Laez	Laziness
Lafet	Celebration, party or festival
Laplap	A pudding made from grated starchy vegetables and plantain

Nakamal	Meeting house
Nalot	A traditional type of *laplap* made from breadfruit and reduced coconut milk
Natangura	Sago palm, a core material for traditional housing
Ni-Vanuatu	People from Vanuatu
Rispek	A socially accepted way of being, of behaving, and of relating to others, based on a *kastom* cultural frame
Stamba	Main stem or root of a plant
Stil	Theft
Storian	To chat, yarn, swap stories
Suqe (Mota Lavan language)	Traditional graded society institution
Tambu	Taboo
Taem bifo	Time before
Taem blong desasta	Time period during a disaster
Taro viti	Fijian Taro
Misis/Masta	Western woman/Western man
Wan pikinini, wan karen	The practice of planting a new garden for each new child that is born
Wovile	A variety of sweet yam

CHAPTER 1

Introduction

This thesis is concerned with community-based adaptation (CBA), an emerging approach to adaptation to climate change[1]. In particular, the thesis is situated in a Pacific islands context. Research assesses the extent to which CBA is able to respond to local people's needs in the case study of Vanuatu. Research findings from this case study inform the emerging theory and practice of CBA, both in the wider Pacific region and beyond. The purpose of this introductory chapter is to state the research aim and objectives, to outline the research rationale and background, and to place the thesis within its conceptual and disciplinary field.

1.1 Rationale, research aim and objectives

Climate change is quickly becoming one of the most significant global issues of the 21st Century. Although measures to mitigate greenhouse gas emissions are crucial to avoiding the worst effects of climate change, adaptation is an essential component of any response. Climate processes and feedbacks are such that even the most stringent mitigation efforts could not prevent further global warming in the coming decades (IPCC, 2007a). In recent years, adaptation has rapidly risen on the agendas of researchers, practitioners and policy makers as a necessary complement to mitigation.

Developing countries are identified as most vulnerable to climate change. Under the United Nations Framework Convention on Climate Change (UNFCCC), (a

[1] In this thesis, 'climate change' is taken to include changes to climate variability and extremes as well as changes in mean conditions.

framework for intergovernmental efforts to tackle the challenge posed by climate change) developed and developing countries have "common but differentiated responsibilities" (Article 1) for addressing the issue of climate change. In particular, developed countries should assist with "meeting the costs of adaptation" in developing countries (Article 4(4)) (UN, 1992). With its increasing profile, increased funding is becoming available for adaptation in developing countries. However, challenges remain in understanding how to implement adaptation in a way that best serves the needs of local communities in these countries.

This thesis is concerned with an emerging approach to adaptation – CBA – in Vanuatu: a Pacific Island, least developed country (LDC) and small island developing state (SIDS). SIDS have long been identified as among the most vulnerable to climate change in the international policy arena[2]. Based on the recently 'agreed' Copenhagen Accord, Vanuatu (being both a SIDS and a LDC) will be a particular target for increased adaptation funding in the coming years:

> … the collective commitment by developed countries is to provide new and additional resources … funding for adaptation will be prioritized for the most vulnerable developing countries, such as the least developed countries, small island developing States … (UNFCCC, 2009).

There is growing interest in CBA, particularly in developing countries such as Vanuatu. This growing interest is because CBA is 'bottom-up' and is therefore a way to address the shortcomings of traditional 'top down' approaches to adaptation. CBA is receiving particular attention in Pacific island countries where

[2] For example, Article 4(8) of the UNFCCC states: "… Parties shall give full consideration to what actions are necessary … to meet the specific needs and concerns of developing country Parties. … especially on: … small island countries" (UN, 1992).

widely-spaced islands pose particular challenges for effective top-down adaptation.

CBA is emerging as a distinct form of adaptation, based within a broader conceptual 'vulnerability-led' approach to adaptation. The key features that distinguish it from other forms of adaptation can be summarised as follows[3]:

- It is participatory. Invariably, CBA is something that should be done 'with' rather than 'to' or 'for' communities. In this way it is more than 'community-level' adaptation.
- It is about empowerment; it 'helps people to help themselves'.
- It increases local voices in decision-making processes about adaptation.
- It is based upon local priorities.
- It engages and builds upon local knowledge and perspectives.
- It builds upon local capacities and skills.

Fundamentally, CBA addresses local vulnerability-reduction priorities, indicating embeddedness within local knowledge systems.

Donor funding directed towards community-based initiatives has increased significantly over the past few years. Most Pacific regional adaptation projects and programmes now include a community component. The importance of community-based adaptation (CBA) is becoming increasingly recognised by institutions involved in financing and implementing adaptation to climate change in developing countries. For example, the Global Environment Facility (GEF) Small Grants Programme has recently begun implementing a CBA project, executed by

[3] This is based on observations and numerous discussions with key stakeholders at the Third International Conference on Community-Based Adaptation to Climate Change, Dhaka, Bangladesh, 18th- 24th Feburary, 2009.

the United Nations Development Programme (UNDP), piloting 8-20 CBA projects in 10 developing countries (one of which is a Pacific Island country (PIC)) (UNDP, 2008). In the Pacific region specifically, the Canadian funded 'Capacity Building for the Development of Adaptation Measures in Pacific Island Countries' (CBDAMPIC) project (implemented by the Secretariat of the Pacific Regional Environment Programme (SPREP)), generated sixteen pilot CBA projects in four PICs – including Vanuatu – between 2002 and 2005 (Nakalevu et al., 2005). This project was heralded as the first Stage III[4] adaptation project to occur in the Pacific. More recently, the Australian Government has formed a Community-based Adaptation Partnership Fund to support the implementation of "effective and scalable community-based adaptation activities" in the Pacific region via a series of Activity Grants (AusAID, 2009: 2). It is likely that this trend will continue and that increasing funding will be directed towards CBA in the coming decades. It is therefore pertinent to take stock of how well CBA is performing in meeting its own aims.

In 2006 I spent some months living in a rural community in Vanuatu. During this time, I observed that the types of activities commonly funded and implemented in CBA projects and programmes (such as the ones listed above) would not address the most important causes of local vulnerability to climate stress. In particular, these activities would not adequately address the factors and processes that local people prioritised as shaping vulnerability. I observed that the dominant knowledge system of the international adaptation community risked subjugating local knowledge[5] and priorities. These observations led me to question the extent to which CBA is, in fact, community-driven. Although CBA

[4] As laid out in Decision 11 of the first Conference of the Parties to the UNFCCC, involving actual initiatives to achieve 'adaptation' as opposed to planning and capacity building.

[5] By local knowledge I refer to culturally specific worldviews and values as well as particular knowledge and practices. This is commonly referred to as indigenous, traditional, or traditional-ecological knowledge (Berkes, 2008; Gorjestani, 2000; Berkes et al., 2000; Agrawal, 1995).

advocates building adaptation from local knowledge and priorities, little attention has been paid to epistemological questions about who decides what constitutes 'vulnerability' and therefore what is appropriate 'adaptation'. These questions have begun to be asked, to an extent, in the field of community-based disaster risk management (CBDRM) field (e.g. Heijmans, 2009; Allen, 2003) and it is important that CBA does not reinvent the wheel in this regard. It is pertinent to ask these epistemological questions while CBA is in its disciplinary infancy.

This problem is particularly acute in the Pacific region where there is a dearth of social-science vulnerability research. Current knowledge in the region remains skewed towards biophysical understandings of vulnerability, based on science-driven initiatives and climate modelling in particular (Barnett and Campbell, 2010). There is a distinct lack of in-depth and documented analyses of Pacific community constructions and views regarding vulnerability, capacity, adaptation needs and appropriate adaptation pathways. The outcome is a lasting paucity of published, peer-reviewed literature regarding Pacific local knowledge in the climate change field. Local voices are therefore largely excluded from the Intergovernmental Panel on Climate Change (IPCC) process and published material has a significant component of top-down, Western data collection and technocratic application (Kelman and West, 2009)[6].

This research addresses this gap by examining the way in which local communities in rural Vanuatu construct their own vulnerability to climate. It critically examines the mainstream international adaptation discourse, highlighting the tensions between this and locally defined adaptation needs. From this, it draws conclusions about the practical ability of planned CBA – as operating within international adaptation discourse – to effectively reduce

[6] Although this is on the increase since the Fourth Assessment Report (AR4) of the IPCC, for example, recent work by Mercer et al. (2007; 2009; 2010) on indigenous knowledge in Papua New Guinea.

vulnerability (thereby facilitating appropriate adaptation) in Vanuatu and other Pacific island countries.

The **aim** of this thesis therefore is to answer the question:

- To what extent does the mainstream international adaptation discourse enable effective community-based adaptation in Pacific island countries?

The **objectives** of the thesis are:

1. To critically evaluate the mainstream international adaptation discourse, in particular, its conceptual framework of vulnerability.

2. To provide a platform for local voices by investigating local constructions of vulnerability in communities in Vanuatu.

3. To evaluate the theory of CBA and critically appraise the extent to which it is applied in CBA implementation.

The research methodology is situated in critical human geography. In seeking to address the status given to Pacific islanders' knowledge and agency in adaptation knowledge and practice, the methodology draws in particular upon poststructuralism and postcolonialism. A participatory research ethic underpinned my on-the-ground research, which constituted examining ni-Vanuatu constructions of vulnerability to climate in a case study community.

1.2 Background to adaptation approaches

The range of approaches to adaptation is broad (see McGray et al., 2007) and approaches to adaptation have expanded over time from a focus on reducing the impacts of climate change, to a focus on reducing vulnerability. The literature often distinguishes these two broad approaches, based on different starting points of analysis (e.g. Kelly and Adger, 2000; Burton et al, 2002; Smit and Pilifosova, 2003). In the literature, these broad categories are commonly referred to as 'first generation' and 'second generation' (Burton et al., 2002), 'top-down'

and ‘bottom-up’ (Dessai et al., 2004) or ‘impacts-led’ and ‘vulnerability-led’ (Adger et al., 2004), the latter of which is the terminology I employ in this thesis.

Generally speaking, CBA is guided by a vulnerability-led as opposed to impacts-led approach to adaptation (Ensor and Berger, 2009). It is situated within the broader move towards reducing vulnerability as opposed to merely minimising expected and experienced discrete climate change impacts. It is now widely recognised within scholarly, practitioner and policy circles that in order to achieve vulnerability reduction, adaptation needs to converge with development. Many of the factors and processes driving vulnerability are socio-economic and political. However, ‘vulnerability’ within the climate change adaptation realm has a conceptual framework that perpetuates a trope of adaptation as something that is distinct from development processes (and vice-versa). This conceptual framework of vulnerability diverges somewhat from its roots in disaster risk reduction and development. Despite the rise in vulnerability-led approaches to adaptation – such as CBA – the ability of ‘adaptation’ activities to actually reduce ‘vulnerability’, given the conceptual meaning of these terms within mainstream international adaptation discourse, is questioned (Schipper, 2007).

1.3 Background to the international adaptation discourse

Internationally, adaptation to climate change has taken on its own exclusive discourse. The term ‘discourse’ has multiple meanings. In this thesis, it refers to “…whole sets of ideas, words, concepts, and practices” (Benton and Short, 1999: 1). Discourse means: “the general context in which ideas take on a specific meaning and inform particular practices” (Benton and Short, 1999: 1). Where the knowledge system and worldview of the mainstream dominates, discourses are hegemonic.

By ‘mainstream international adaptation discourse’, I refer to the dominant way of structuring knowledge and practice within the international adaptation community (e.g. major funding agencies, policy makers, governments and NGO’s

involved in adaptation to climate change). At the core of mainstream international adaptation discourse is the international adaptation policy agenda (revolving around the UNFCCC). Interpretations of this shape dominant 'ways of knowing' about vulnerability and adaptation and the way that this is played out in adaptation implementation.

At an international policy level adaptation has its own agenda, separate to disaster risk reduction and development, under the UNFCCC. Given the centrality of social systems in vulnerability-led adaptation, scholarly debate is rife with the need to better integrate adaptation with development and disaster risk reduction (for instance, see papers in *Disasters*, 30(1)) [7]. In a policy and funding sense however, adaptation remains perceived as a discrete set of theory and practice, 'additional' to 'normal' development or disaster risk reduction activities.

Despite adaptation becoming increasingly prominent on the agendas of the international disaster risk reduction and development communities (e.g. UNISDR, 2005; UNDP, 2007), mainstream international adaptation discourse is shaped primarily by this discrete international climate change policy framework

[7]Although theory and best-practice are exchanged among these three broad fields within the *academic and research* sphere, this has not effectively infiltrated the *policy and funding* sphere to date (Schipper, 2009; Gaillard, 2010). The need for integration is being increasingly recognised by the international climate change community (e.g. the recently initiated Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation undertaken by the IPCC (IPCC, 2009). Ironically, a key reason why climate change adaptation progresses as a relatively discrete agenda from disaster risk reduction and development is that existing funding mechanisms for adaptation (from both multi-lateral and bi-lateral sources) require adaptation to be additional activities on top of sustainable development and disaster risk reduction activities (for instance, as stipulated as "new and additional financial resources" by the UNFCCC in Article 4(3)). This reinforces a continuing lack of effective integration and learning between these communities of research and practice and thus sustains a discrete mainstream international adaptation policy discourse. Lack of integration is self-sustaining.

(Schipper, 2007). Indeed, many other policy and practitioner communities who have 'taken on' adaptation, base much of their policy formation and decision-making on the discourse of adaptation emerging from the international climate change community[8].

Mainstream adaptation discourse is underpinned by a discernable conceptual framework. By this I mean that 'adaptation' and the key theoretical concept underpinning it – 'vulnerability' – are framed in a particular way. Within mainstream adaptation discourse, vulnerability is the keystone concept with 'adaptive capacity' and 'resilience' as mutually dependant and inter-dependant[9] (Ensor and Berger, 2009). These concepts also take on particular meanings in the climate change context. The scholarly compilations of the IPCC are highly influential in this regard. Although these theoretical concepts have their roots in other established fields (namely: natural hazards and entitlements (Adger, 2006)) and although they are the topic of much academic debate (e.g. see papers in *Global Environmental Change,* 2006, 16(3)), they have developed distinct discursive meanings within mainstream adaptation frameworks, as distinct from disaster risk reduction and development frameworks.

[8] This assertion is based, in part, on observations made at the Third International Conference on Community-Based Adaptation in Dhaka, Bangladesh, 2009. The majority of organisations actually funding and/or 'doing' adaptation on the ground do not have a traditional disciplinary background in climate change research and practice. It therefore makes sense that the mainstream international adaptation discourse is where they look to define how to proceed with adaptation – conceptually and practically. This applies to both grassroots NGOs and large international agencies. The mainstream international adaptation discourse thus sustains the current dominant trajectory of adaptation.

[9] Although the word 'resilience' is becoming increasingly prominent in the international climate change realm with many recent initiatives using this word in place of 'vulnerability reduction' (e.g. UNEP, 2010).

What this means in practice is that this mainstream international adaptation discourse and the conceptual framework underpinning it are highly influential in shaping the trajectory of adaptation. In other words, what is, and what is not, considered to be 'adaptation to climate change' is largely determined by the mainstream international discourse. Ultimately, this is what informs policy makers and practitioners as to the types of activities that can be funded, or not, within initiatives for planned adaptation (whether these are dedicated multi-lateral adaptation funds, or official development assistance). It shapes decision-making about adaptation and therefore determines what the outcomes are for people affected by climate change, on the ground.

1.4 Disciplinary perspective: disaster risk reduction

CBA is an approach being rapidly taken up by grassroots organisations across the disciplinary spectrum, for example: disaster risk reduction, humanitarian assistance, sustainable livelihoods and poverty reduction, natural resource management, gender, human rights and child rights. In working with local communities, these organisations are incorporating climate change adaptation discourses into their existing work programmes. Each field brings its own theoretical and conceptual frameworks and accordingly, there are many conceptual and methodological entry points to 'doing' CBA. For instance (in a very coarse sense), a disaster risk reduction entry point would approach adaptation as modifying and building upon participatory activities to reduce underlying vulnerability and risks associated with natural hazards, whilst a sustainable livelihoods entry point would be concerned with ensuring the resilience of various 'capitals' (e. g. social, financial, natural) in the face of climate change shocks and stresses. Thus, it is important to make the disciplinary leaning of this research clear.

This research uses a broad disaster risk reduction framework as an entry point to framing adaptation to climate change. In the Pacific, changes in regional climate are expected to increase the intensity and frequency of problematic rainfall

events (floods and droughts), El Niño events and tropical cyclones. Sea level change will exacerbate problems of coastal flooding, storm surge and erosion. Climate change will likely intensify many existing problems associated with current climatic variability and extremes. Increases in many of the climate-related problems already faced are therefore likely to be the most significant challenges for Pacific island communities in the shorter to medium term. This thesis assumes that changes to climatic variability and extremes will be among the most significant implications for local communities. It makes the assumption therefore, that reducing vulnerability to climate change, in the first instance requires reducing vulnerability associated with current climatic variability and extremes. It assumes that learning from past and current experiences of climate stress is the most effective way to understand vulnerability and resilience to climate change. The disaster risk reduction tradition has been particularly prominent in the formation of climate change adaptation concepts, particularly approaches falling into the broad category of 'vulnerability-led' adaptation.

It is well established that climate change adaptation needs to be integrated with disaster risk reduction and that both of these need to be integrated with development processes to reduce vulnerability. This is in terms of both international policy and more localised implementation. However, there has been little consensus to date regarding how to merge these traditionally 'stand-alone' agendas (Mercer, 2010; Gaillard, 2010; Schipper, 2009; Tearfund, 2008; Schipper, 2007; Thomalla et al., 2006; Schipper and Pelling, 2006).

This thesis contributes to these debates by taking the standpoint that disaster risk reduction is a pertinent entry point to climate change adaptation, rather than the other way round (Gaillard, 2010). Disaster risk reduction involves addressing the underlying 'root' causes of vulnerability that operate largely separately from the physical hazard itself – these are mainly social, economic, political, cultural and environmental in origin (Wisner et al., 2004). Disaster risk reduction therefore, requires a tight integration with development processes.

This is generally what is considered to be 'vulnerability reduction' in the disaster risk reduction field; development-focussed initiatives that make people better able to deal with a range of physical stressors, regardless of the specific nature of these. This approach has roots in bottom-up, local research and practice. A broad disaster risk reduction framework therefore offers a useful way forward to learning about what makes people vulnerable in the context of climate change stresses.

1.5 Thesis organisation

The thesis is organised into seven chapters. Chapter Two provides the conceptual basis of the thesis by unpacking the concepts of vulnerability and adaptation as they are applied in the climate change field. The conceptual framework of vulnerability, as arising from mainstream adaptation knowledge and practice, is examined and compared to its disciplinary roots in other fields. This, in part, addresses objective one, which is addressed in full in Chapter Six.

In Chapter Three I outline and critically reflect upon the methodology employed in the research. This chapter explains the methods I developed to enable me to address objective two. It outlines the progression of my research, explaining the choice of research topic and its theoretical underpinnings. It critically reflects upon participatory practice in established vulnerability assessment methodologies, linking these to the mainstream adaptation discourse.

This leads into Chapters Four and Five where I represent local voices from a rural community in Vanuatu. These chapters examine local socio-cultural constructions of vulnerability and priorities for reducing it, addressing objective two. Chapter Six is a discussion of the key issues that have arisen in the chapters that have come before. In Chapter Six I bring together local constructions of vulnerability with constructions prevalent in the mainstream international adaptation discourse. In doing this, I am able to critically evaluate the mainstream international adaptation discourse as required by objective one. Based on this, I am able to evaluate the extent to which CBA theory can be

applied in implementation, as required by objective three. Chapter Seven then concludes by directly answering the question posed as the overall research aim.

CHAPTER 2

Adaptation to Climate Change and Vulnerability

2.1 Introduction

This chapter analyses the key theoretical concept underpinning CBA – vulnerability – and what it means to reduce it. In doing this it sets the scene for addressing objective one: **to critically evaluate the mainstream international adaptation discourse, in particular, its conceptual framework of vulnerability**. Critically examining the theory of vulnerability is important to my discussion of CBA, as prevailing academic and bureaucratic conceptualisations do not always mesh with local ideas, yet they pre-determine assessment and therefore adaptation implementation in planned CBA. In some respects, the dominant application of vulnerability in the climate change field diverges from the original theoretical frameworks from which it was born.

I begin the chapter by reviewing the climate change adaptation literature. I outline progressions over time in the field regarding mainstream understandings of what adaptation 'means'. Two broad conceptual approaches are identified and discussed: the 'impacts-led' and 'vulnerability-led' approaches. CBA is underpinned by the latter approach – vulnerability is a keystone theoretical concept in CBA. I then consider the variable relationship between adaptation and the concept of vulnerability – what I call the 'vulnerability-adaptation complex'. I distill the literature regarding the various ways in which vulnerability has been (re)produced and defined within the climate change field with reference to contributions made by "seedbed" disciplines (Adger, 2006). I identify two primary relationships, which I refer to as 'end-point vulnerability' and 'starting-point vulnerability'. Starting point vulnerability focuses on social, structural drivers of vulnerability and on adaptive capacity. Starting-point vulnerability

underpins the theory of CBA. I then move to a specific analysis of the way in which the concept of vulnerability is treated in disasters research. I focus on the 'vulnerability paradigm', considering the contributions made by political economy, political ecology and constructivism. The disasters research field has made essential contributions to starting-point interpretations of vulnerability and to vulnerability-led adaptation more broadly. Finally, I characterise the 'theory' of CBA as it relates to broader theories of vulnerability.

In this chapter, I am largely examining 'instrumental definitions' of vulnerability in relation to climate change – conceptualisations aimed at providing templates for applied assessment (Barnett and Campbell, 2010). Vulnerability has taken on different instrumental definitions within the two broad approaches to adaptation, thus providing different templates upon which to evaluate it and (purportedly) resulting in different implementation activities. CBA activities (being a type of vulnerability-led adaptation) hinge upon understandings of vulnerability dominant in the international adaptation realm. As I discuss in Chapter Three, the instrumental notion of vulnerability dominant in climate change adaptation discourse is what initially shaped my own vulnerability assessments.

2.2 Approaches to adaptation

The way in which climate change adaptation is theorized and practiced is diverse. Although used in the 1980's, the word 'adaptation' became prevalent in relation to climate change after 1992 when it was first used in the text of the UNFCCC (UN, 1992). Since this time it has developed its own broad meaning and interpretation within the climate change arena. As the perceived importance of adaptation as a response to climate change has grown among policy-makers, practitioners and scholars, its conceptual complexity has also grown. There remains no single coherent 'adaptation theory' and interpretations are diverse and contested within scholarship and policy (Schipper and Burton, 2009).

A broad progression in thinking can be observed over the last two decades from framing adaptation in terms of reducing impacts, to framing adaptation in terms of vulnerability reduction. In the literature, approaches to adaptation are generally distinguished by those that are 'impacts-led' and those that are 'vulnerability-led' although this has variable terminology (Burton et al., 2002; Smit and Pilifosova, 2003; Adger et al., 2004; UNFCCC, 2005; Fussell and Klein, 2006; McGray et al., 2007; Barnett, 2010). These categories represent two broadly different perspectives depending on whether impacts or vulnerability is the primary focus of analysis and practice. In practice, adaptation instances fall between these two poles, as is illustrated by McGray et al. (2007) in their continuum of adaptation activities (Figure 1).

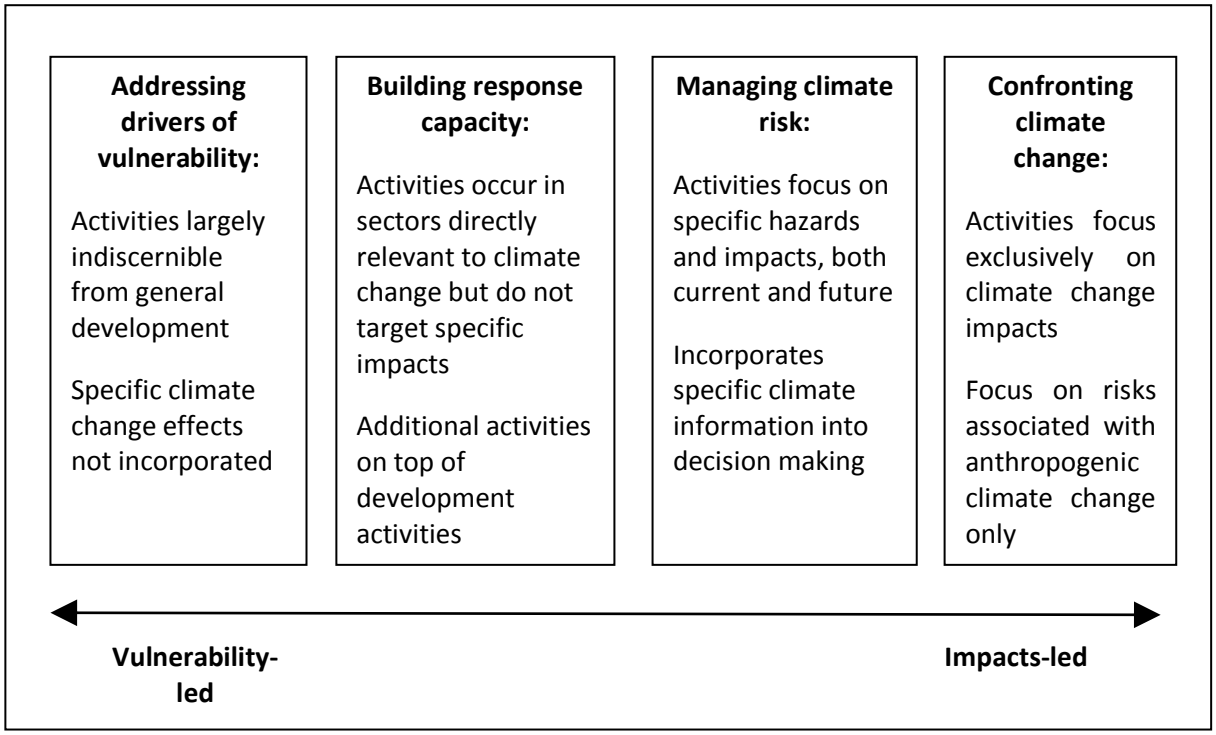

Figure 1 A continuum of adaptation activities: from development to climate change. After McGray et al (2007:18)

McGray et al., (2007) contend that adaptation practice falls along a continuum where either impact-reduction or vulnerability-reduction is emphasised in assessment and practice. I adhere to this viewpoint. The broad classifications of 'impacts-led' and 'vulnerability-led' adaptation enabled reflection upon how

interpretations of adaptation have evolved and expanded over time, bringing in theory from other fields, rather than to suggest that adaptation activities should be one or the other. Different situations require different responses. For instance, where climate change is clearly causing immediate negative impacts, reducing these impacts in the first instance makes the most sense. Where uncertainty remains however, or where 'non-climate' stresses are the biggest threat to dealing with climate change, reducing vulnerability may be more appropriate. This is articulated as 'the adaptation space' by Ensor and Berger (2009: 28). However at each end of the continuum, adaptation has different meanings and therefore different types of activities are qualified as 'adaptation'.

Over time adaptation has become more associated with the concept of vulnerability and the related concepts of adaptive capacity and resilience. This movement has brought in theory and 'best practice' from fields outside climate change where these concepts have been in use for a longer time. The treatment of the adaptation concept has not changed linearly – rather, the emphasis of assessment and practice has evolved and diversified over time as the field has grown and its complexity increased. Smit et al. (2000) distinguishes between types of adaptation in an "anatomy of adaptation", attributing different approaches to adaptation as arising from various understandings of three core elements: i) adaptation to what? ii) who or what adapts? And iii) how does adaptation occur? (Smit et al., 2000: 223). The principal features distinguishing impacts-led from vulnerability-led approaches are summarized in Table 2, according to Smit et al.'s (2000) three key questions. I add a fourth question: iv) what role does the concept of vulnerability play?

Table 2 Key features of impacts-led and vulnerability-led adaptation, following Smit et al. 's three key questions (Smit et al., 2000) with a fourth question added.

	Impacts-led approach	Vulnerability-led approach
i) Adapt to what?	Long term future changes in climate stimuli beyond the realm of lived experience Specific physical hazards	Current and future variability and extremes, and changes to these building upon lived experience A range of uncertainty or a broad range of hazards
ii) Who or what adapts?	Biophysical systems at broad scales Sectors	Human-environment and socio-economic systems at a range of scales People and communities
iii) How does adaptation occur?	By a focus on reducing exposure, driven by climate scenarios By interventions that reduce damages and costs associated with particular stimuli By discrete measures and strategies By technocratic measures From the top down	By reducing exposure to hazards and building capacity and resilience By integration with development and disaster risk reduction By processes By context specific initiatives From the bottom up as well as from the top down In a 'no-regrets' manner by accruing short term benefits regardless of climate change
iv) What role does the concept of vulnerability play?	As an 'end point' of analysis after adaptation has taken place	As the 'start point' of analysis, determining what adaptive actions are needed.

In these two broad approaches to adaptation, the concept of vulnerability is treated differently; it plays a different role in relation to 'adaptation'. This is largely what defines impacts-led from vulnerability-led adaptation (Kelly and

Adger, 2000; Burton et al., 2002; Brooks, 2003; Smit and Pilifosova, 2003; O'Brien et al., 2004). While impacts-led approaches generally begin assessment with scenarios of long term average changes, and focus on 'specific adaptations' to reduce future potential impacts, vulnerability-led approaches begin with stresses – and the contextual *reasons* for these stresses (Kelly and Adger, 2000; Smit and Pilifosova, 2003; Ford and Smit, 2004; Smit and Wandel, 2006). The following two sections outline the implications of these two conceptually different approaches to adaptation for assessment and practice.

2.2.1 The roots of adaptation to climate change: the impacts-led approach

Impacts-led approaches are variably referred to as the "standard approach" (Burton et al., 2002), the "conventional approach" (Smit and Pilifosova, 2003), and the "top down" approach (Dessai, et al, 2003). Labels aside, these approaches have a number of distinctive features in common, and dominated adaptation research throughout the 1990s (Burton et al, 2002; Schipper, 2009). Impacts-led approaches continue to prevail; the Fourth Assessment Report of the IPCC (AR4) identifies that a large proportion of assessment methods described within the Working Group Two (WG2) report are based on this approach (Carter et al., 2007: 135).

The conceptual standpoint of impacts-led adaptation is a product of its original policy domain. Impact studies are generally construed as the earlier approaches to assessment for adaptation, being closely connected to the mitigation policy domain. The perceived policy relevance of adaptation has changed over the past two decades and so too has its perceived purpose. Adaptation is moving from being the "handmaiden to impacts research in the mitigation context" (Burton et al., 2002: 145) to having its own distinct policy agenda, hence the increasing prevalence of other non-impacts-based approaches to adaptation. Impact studies were conceived principally to address the ultimate objective of the UNFCCC, outlined in Article 2 (Burton et al., 2002; Pittock and Jones; 2009):

> … stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system…within a timeframe sufficient to allow ecosystems to adapt naturally to climate change … (UN, 1992);

and to therefore meet commitments under Article 4.1(b), to:

> Formulate, implement publish and regularly update national, and where appropriate, regional programmes containing … measures to facilitate adequate adaptation to climate change (UN, 1992).

Ascertaining impact is necessary to determine what constitutes 'dangerous' climate change. The purpose of adaptation therefore, is to reduce impact, thereby moderating these 'dangerous' changes in climate alongside mitigation efforts. At the inception of impacts assessment and during the 1990's the prevailing view of adaptation was as an alternative to mitigation, potentially reducing the urgency of reducing greenhouse gas emissions (Pielke, 1998; Smit and Pilifosova, 2001; Burton et al., 2002; Klein et al., 2003; Schipper, 2009). Impact analyses at this time were generally to inform the mitigation policy domain; to determine an optimal balance between adaptation and mitigation measures. As such, the impacts-led approach is principally intended to answer questions such as: "What is the extent of the climate change problem?" and "Do the costs of climate change exceed the costs of greenhouse gas mitigation?" (O'Brien et al., 2004: 3). This is reflected in the structure of the Second Assessment Report (SAR) of the IPCC, where impacts, adaptations and mitigation were considered by the same working group (WG2) (Watson et al. 1995).

The impact-led approach is so-named because assessments focus primarily on ascertaining the impacts of climate change, where impact is taken to mean potential 'damages costs' arising from climate change (Carter et al., 1994; Parry and Carter, 1998). Adaptation itself is in the form of specific measures selected and designed following impact assessment, although the focus is primarily on measuring impact rather than on facilitating adaptation to these impacts. These

adaptation measures are intended to moderate or offset adverse impacts and take advantage of positive opportunities (Tol et al., 1998). The overall premise is that a range of alternative adaptation options can be generated and "the most suitable strategies for minimizing the effects of climate change, were they to occur" identified, based on measurements of impact (Carter et al., 1994: 825). Therefore, the overarching purpose of the impacts-led approach is, essentially, to estimate the damage-costs of climate change and the difference adaptation could make to these (Smit and Wandel, 2006).

The IPCC developed the first official international guidelines for impacts and adaptation assessment in the early 1990's (Carter et al., 1994). These guidelines (revised in 1998 by Parry and Carter(1998)) form the basis of a number of key early climate change impacts and adaptation initiatives including: the United States Country Studies Programme (USCSP) (Benioff et al., 1996 cited in Smith and Lazo, 2001), and the United Nations Environment Programme Handbook on Methods for Climate Change Impact Assessment and Adaptation Strategies (Feenstra et al., 1998). The motivation for these initiatives was overwhelmingly the need to understand the magnitude of impact in order to determine with what urgency to implement mitigation measures (Kelly and Adger, 2000; Burton et al., 2002).

The impacts-led approach has a definitive methodological assessment framework, outlined in Figure 2. Although impacts assessment is now rarely used to estimate the required magnitude of mitigation, the seven step framework remains a legitimate and widely applied approach to adaptation assessment. The impacts-led approach is characterized by beginning with scenarios of future average climate derived from general circulation models (GCMs). These scenarios provide input to biophysical and (less frequently) socio-economic models that are then used to assess future exposure – of the exposure unit in question – to climate variables (Carter et al., 1994; Parry and Carter, 1998; Smith and Lazo, 2001; Jones, 2001; UNFCCC; 2005).

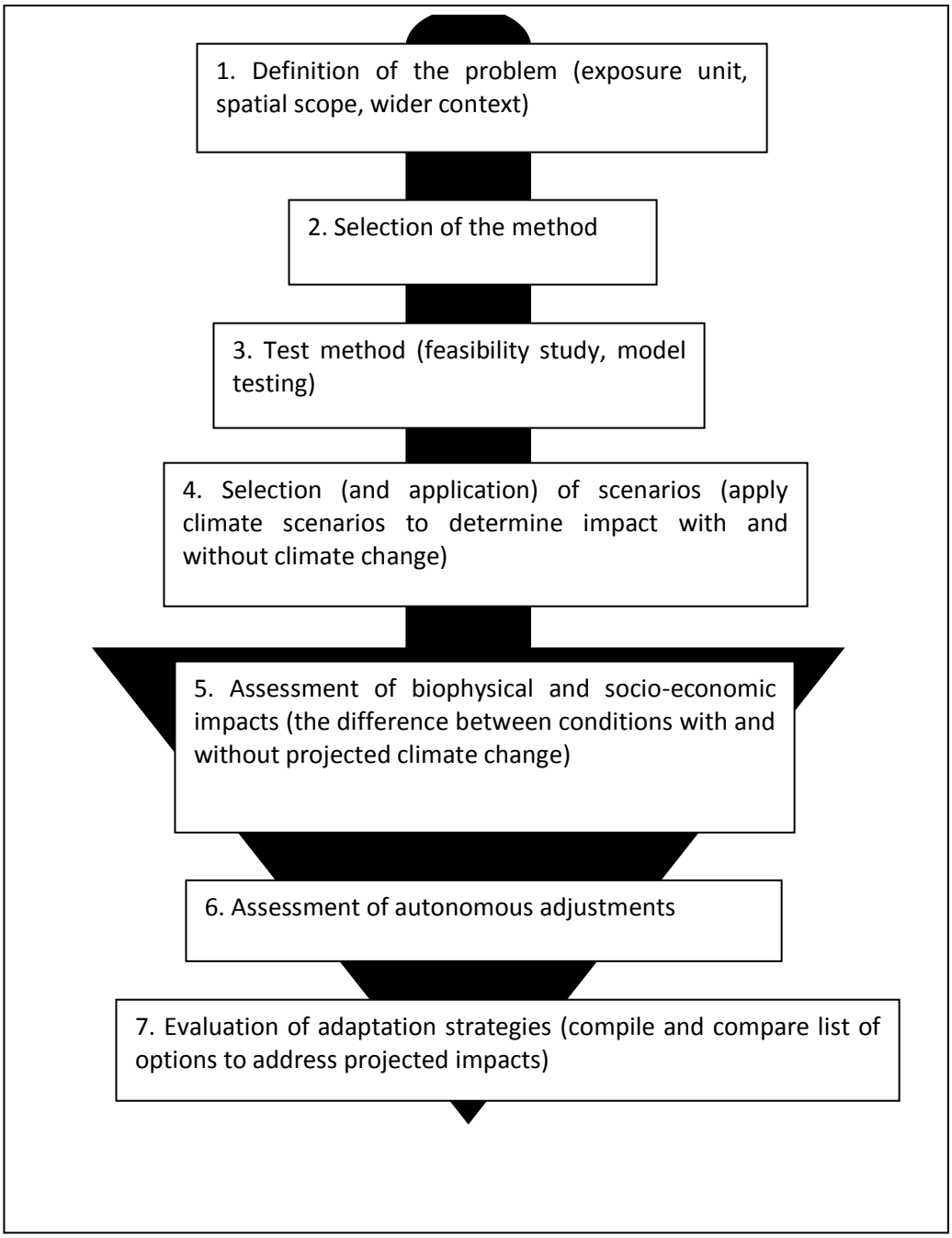

Figure 2 The seven step framework for climate impact and adaptation assessment (after Carter et al., 1994: 826)

The process begins with the physical climatic system, working towards the human system. The 'exposure units' or units of study in impact assessments are defined in Carter et al. (1994), and Parry and Carter (1998) as sectors, activities or regions. For instance, the units of study for assessments conducted within the USCSP were sectors assumed to be particularly climate sensitive such as coastal

resources, agriculture, and forestry (Smith and Lazo, 2001). The impacts-led approach is intended for application at broad administrative, geographical and ecological scales (see Parry and Carter, 1998). As climate change research and policy has broadened over time a number of limitations in this process have been identified (see Table 3). These limitations catalyzed the expansion of conceptual approaches that prioritize adaptation itself; an aspect not effectively facilitated in an impacts assessment approach.

Thus, adaptation to climate change has its roots in impacts studies to serve a mitigation-focused policy agenda. In the early stages, adaptation was juxtaposed to mitigation being commonly (and detrimentally) regarded as an alternative to reducing harmful GHG emissions. In its initial stages within an impacts-led approach, adaptation was perceived by researchers and policy-makers as a 'science problem' in the context of climate, not development (Schipper and Burton, 2009). The top-down, climate science emphasis may have been reinforced by the domination of meteorologists, climatologists and biophysical scientists in the initial working groups of the IPCC (R. A Warrick, pers comm. 05.08.2007). This has been effective in generating an extensive literature on climate change impacts on physical and biophysical systems, (compiled in Watson et al., 1995; McCarthy et al., 2001; and Parry et al., 2007), but largely de-emphasizes adaptation itself as an outcome.

Although adaptation is increasingly becoming viewed as a mandatory activity irrespective of mitigation efforts and although it has developed its own policy domain, aspects of these impacts-based roots remain in dominant perceptions of adaptation. Schipper (2009) contends that a prevailing impacts-based perception of adaptation is a product of the inherently mitigation focused international climate policy regime; the UNFCCC is primarily intended to reduce greenhouse gas emissions and adaptation is not defined within it. The existing framework of the UNFCCC makes it difficult to address adaptation (Pielke, 2005; Ford, 2009;

Burton, 2009) and Schipper (2009: 359) contends that "adaptation policy may find a more appropriate home beyond the existing climate change regime".

Table 3 Limitations of the impacts-led approach that provided a catalyst for the expansion in adaptation thinking

Limitation	Comments
Adaptation itself is not adequately facilitated	Step 7 (Figure 2 above) is seldom addressed in any depth because the assessment process depends upon identification of specific options, after a lengthy and expensive impact projection process (as in Smith and Lazo, 2001). In earlier studies- particularly in developing country contexts where resources are limited – the adaptation stages were only briefly addressed, if they were addressed at all (Tol et al., 1998; Smith and Lazo, 2001; Burton et al., 2002; Ford and Smit, 2004). During earlier studies climate change was considered to be a future phenomenon, contributing to a lack of emphasis on adaptation itself.
Impacts and adaptation are framed as biophysical	Although the importance of engaging socio-economic scenarios alongside climate scenarios is explicitly stated in Carter et al. (1994) and Parry and Carter (1998), in reality, this occurs infrequently (Ahmad and Warrick, 2001; Berkhout et al., 2001; UNFCCC, 2005) because socio-economic futures are difficult to quantify (Berkhout et al., 2001). This is problematic as the socio-economic condition or state of the system in question is likely to be of equal or larger consequence to net impacts than projected climate change alone (Kates et al., 1985; Burton et al., 2002; UNFCCC, 2005).
Does not account for uncertainty in climate or socio-economic projections	Steps 1 to 6 (Figure 2) depend on precision in determining impact, however, a high degree of uncertainty is inherent in climate change scenarios. Thus, uncertainty is amplified in impact models (Jones, 2001; Ensor and Berger, 2009). The range of potential impacts is broad, making the identification of adaptation options impractical (Burton et al., 2002; Smit and Pilifosova, 2003; Adger and Vincent, 2005; Pittock and Jones, 2009). Projecting future socio-economic conditions is also highly uncertain (Smith and Lazo, 2001; Berkhout, 2001). Ahmad and Warrick (2001) recognize the need to better manage and express ranges of uncertainty in impact assessments, and there have since been a number of methodological developments in this respect (see Carter et al., 2007)
Assumes rationality in 'autonomous' adaptation	Impact is determined based on residual or net adverse effects following 'autonomous' or self-identified adjustments or adaptations. This is based on one of two

	assumptions; that no autonomous or anticipatory action will occur (Tol et al., 1998) or more frequently, that adaptation will occur on the basis of rational choice (Dessai et al., 2004). Realistically, the bounds on rational choice are numerous in human decision making. Even where full information about alternative courses of action is accessible (a rare occurrence in itself), optimal adjustments will not always be selected due to resource allowances and a raft of other constraints (Burton et al., 1978). The processes and mechanisms by which adaptation decision-making occurs is not addressed in most impacts-led assessments (Ahmed and Warrick, 2001; Ford and Smit, 2004; Smit and Wandel, 2006)
Adaptation occurs at broad scales	GCM scenarios produce outputs at global and regional scales and downscaling to local levels is largely problematic (Ahmed and Warrick, 2001). As a result, impacts and adaptation assessments necessarily occur at mostly broad scales, and outcomes may not be relevant to, or suitable for local scale realities (Jones, 2001; Smit and Pilifosova, 2003; Adger et al., 2004)
Adaptation is separated from 'non-climate' change policy or decision making	Step 7, if it is reached, generally takes the form of a 'shopping list' of largely infrastructural or technological measures discrete from other policy or decision-making processes (Ahmed and Warrick, 2001). These 'shopping list' options can be ineffective or even maladaptive in local scale situations, and measures are unlikely to be successful unless integrated with broader processes (Smit and Pilifosova, 2003; Schipper, 2007).
'Adaptation' is to future, climate *change* only	Climate change scenarios place emphasis on adaptation to long term, future, average changes in climate, thereby detracting from current and shorter term impacts from variability and extremes (Burton et al., 2002; Downing, 2003). Increases and changes in variability and extremes could have greater impacts than changes in mean climate values, particularly in the context of sustainable development (Kelly and Adger, 2000; Smit et al., 2000; Ahmed and Warrick, 2001).
Adaptation investments are not appropriate for developing countries	Adaptation 'shopping lists', if they are made, are likely to be highly speculative, and therefore of low priority to developing countries that face a multitude of pressing and short term issues in other areas such as poverty, inequality and health (Burton et al., 2002; O'Brien et al., 2004). In a developing country context, adaptation cannot afford to be speculative and needs to accrue immediate benefits regardless of future climate change (Huq et al., 2006). It is assumed that the procedures and evaluation criteria

	prescribed (based on what works in a developed country context) will be universal to all countries and this is not the case (Barnett, 2001).

2.2.2 Enter vulnerability

Adaptation received increasing attention as a necessary complement to mitigation efforts in the late 1990s and early 2000s. This was largely in response to the shortcomings of impacts-led approaches in facilitating feasible adaptive outcomes, particularly in developing countries, as required in Article 4(4) of the UNFCCC (see below). It became increasingly recognised during this time that mitigation efforts would be insufficient to prevent 'dangerous climate change' and that adaptation would be necessary regardless of mitigation because of GHGs already in the atmosphere. Adaptation, therefore took on a new importance as an issue complementary, rather than alternative to mitigation.

Adaptation began to be perceived as a distinct policy issue separate from the mitigation agenda within the climate regime and this was led largely by developing country concerns (Huq et al., 2003; Sokona and Huq, 2002; Huq and Reid, 2004; Schipper, 2009). Within the IPCC, adaptation was given its own chapter (WG2) separate from mitigation (WG1) for the first time in the TAR (McCarthy et al., 2001). With this increasingly distinct adaptation policy agenda, a shift towards the concept of vulnerability can be observed (Schipper, 2009).

The vulnerability-led approach to adaptation grew predominantly post-2001 in response to international negotiations, led by developing countries, regarding the importance of improving provisions for adaptation and adaptation policy. The result was the Marrakesh Accords (UNFCCC, 2002a) which outlined three adaptation-focused funding provisions aimed at promoting adaptation in developing countries under the UNFCCC and its Kyoto Protocol (Huq et al., 2003; Burton et al., 2002; Schipper, 2009). The Marrakesh Accords were the first formal recognition of the particular issues faced by developing countries within

international climate change policy, thus bringing the concept of vulnerability and development to the fore in adaptation studies (Adger et al., 2003). Thus, emphasis on studies concerning where adaptation should be prioritized, how best to proceed with adaptation and how adaptation should be funded, increased significantly after 2001. This placed new emphasis on Article 4. 4 (UN, 1992):

> The … developed country Parties … shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects.

Thus, emphasis was placed upon vulnerability as opposed to merely impacts in adaptation thinking. Adaptation assessments and adaptation itself were required to address a different conceptual challenge; the principal questions to be addressed by a vulnerability-led approach are: "Who is vulnerable to climate change and why?" and "How can vulnerability be reduced?" (O'Brien et al., 2004: 3). Vulnerability-led approaches therefore, shift emphasis away from determining the extent to which adaptation can reduce the need for mitigation, to determining where adaptation is needed and how to best design and deploy policies and initiatives in conjunction with stakeholders (Burton et al., 2002; Carter et al., 2007).

This requires attention to be paid to "the underlying socio-economic and institutional factors, and … political and cultural factors, that determine how people respond to and cope with climate hazards" (Adger et al., 2003: 6). Accordingly, the vulnerability-led approach is often referred to as a 'bottom-up' approach (Dessai et al., 2004), or the 'second generation' of adaptation studies (UNFCCC, 2005; Fussel and Klein, 2006) that begin assessment with the broad social and environmental context of the system of interest, rather than with the climate stimulus (Ensor and Berger, 2009). In comparison to the scenario-driven impacts-led approach, the vulnerability-led approach focuses on the state or

condition of a specific system – and the processes and structures determining this condition – as giving rise to negative impacts, given climate stimuli (Kelly and Adger, 2000; Smit and Pilifosova, 2003; O'Brien et al., 2004; Adger et al., 2004; Ford and Smit, 2004; UNFCCC, 2005; Smit and Wandel, 2006; Turner et al., 2003; Downing and Patwardhan, 2004; Ensor and Berger, 2009).

A vulnerability-led approach forms the basis of recent adaptation research and policy initiatives such as the United Nations Development Programme (UNDP) Adaptation Policy Framework (APF) (Lim et al., 2004), the National Adaptation Plans of Action (NAPA) guidelines (UNFCCC, 2002b) and the Assessments of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors (AIACC) programme (Leary et al., 2008a; Leary et al., 2008b). The overarching motivations of these initiatives are to identify practical ways and means of reducing vulnerability to current and future climate variability and extremes in developing countries via adaptation processes that are integrated with sustainable development (Wilbanks, 2003). These and many other international adaptation initiatives in a developing country context adopt some form of the vulnerability-led approach (Smit and Pilifosova, 2003).

Smit and Pilifosova (2003: 20) describe vulnerability assessment in the climate change context as the "inverse" of impact assessment. However, unlike the seven step impacts assessment framework approach developed by Carter et al. (1998), there is no single universally followed vulnerability assessment framework within the climate change field. Instead, frameworks are developed to suit particular purposes, in particular contexts and at particular scales. Reflecting the vastly multidisciplinary nature of the climate change adaptation field, many of these frameworks are derived from related fields such as natural hazards, food security, and sustainable livelihoods. Addressing the state of vulnerability in adaptation efforts requires a more flexible guidance approach than is afforded by Carter et al., (1994).

The APF outlines a 'roadmap' of possible analytical techniques to assist in identifying appropriate vulnerability-led adaptation strategies for specific contexts. The APF outlines four main distinguishing characteristics of the vulnerability-led approach that are discussed throughout the literature, and these are summarized as (Lim et al., 2004: 1):

1. Adaptation to short-term climate variability and extreme events serves as a starting point for reducing vulnerability to longer-term climate change.

2. Adaptation policy and measures should be assessed in a development context.

3. Adaptation occurs at different levels in society, including the local level, and,

4. The adaptation strategy and the stakeholder process by which it is implemented are equally important.

These characteristics distinguish a vulnerability-led from an impacts-led approach and loosely denote an inverse assessment process to that of an impact-led approach (Smit and Pilifosova, 2003). These characteristics are particularly pertinent to adaptation in a developing country context.

2.2.2.1 Benefits for developing country contexts: adaptation to uncertainty, from the bottom-up

The vulnerability-led approach is based on the premise that:

> Addressing climate change means enhancing the ability to cope with present-day climate variability and long-term climate uncertainly. To do this there is a need to first understand the drivers that underlie vulnerability (O'Brien et al., 2004).

From this perspective, reducing current vulnerability with respect to climate conditions will also reduce vulnerability with respect to future climate

conditions, given that climate change is expected to exacerbate current climate risks and it is *vulnerability* being reduced, not specific impacts (Handmer, 2003; van Aalst, 2006; Adger et al., 2007)[10]. Vulnerability-led adaptation is about building overall system resilience and enhancing adaptive capacity to deal with climate conditions, regardless of the specific nature of these. In a paper that has played a key role in defining a vulnerability-led approach to adaptation Kelly and Adger (2000: 326) argue that:

> … the primary linkages between social, economic and political characteristics and trends and the capacity to react to environmental stress … will hold on all timescales, even if the precise response strategies alter in nature or relative significance.

A key outcome of beginning the adaptation process from the concept of vulnerability is that initiatives to reduce vulnerability are likely to have multiple co-benefits. This is commonly referred to as 'no-regrets' adaptation, because initiatives are often worth doing anyway (Rojas Blanco, 2006). Strategies are often "the same as those which contribute in a positive manner to sustainable development, sound environmental management, and wise resource use" (Hay et al., 2003: 63). This approach is particularly important in a developing country context where: a) high quality data for use in impact assessment is often lacking; b) investing scarce resources in an uncertain and/or future adaptation strategy is unlikely given other pressing issues, and; c) many possess a high current level of vulnerability to climate conditions and thus require measures that reduce current, as well as future vulnerability (Barnett, 2001; Handmer, 2003; Adger et al., 2003; Davidson et al., 2003; Adger et al., 2004; O'Brien et al., 2004).

[10] Although of course this process needs to take into account likely future changes in climate, especially as some changes may diverge significantly from current circumstances (Adger et al., 2007).

Importantly, the nature of the vulnerability-led approach is such that the uncertainty inevitable in climate science is not a hindrance to the adaptation process, as it can be in an impacts-led approach. In a developing country context, it can be difficult to justify investment in measures that are based on fairly uncertain projections of future climate. Beginning with reducing the vulnerability of a system to current climate conditions as a means of building capacity to cope with future conditions does not necessarily require high quality information about future climate (Adger et al., 2004; O'Brien et al., 2004). From a vulnerability perspective, waiting for certainty in the generation of adaptation options can generate maladaptive adaptation, if future climate change does not manifest in the way predicted via modeling (Burton et al., 2002; O'Brien et al., 2004; Adger, 2003). Although technological solutions are an important component of adaptation, they are unlikely to address the raft of underlying social drivers of vulnerability to climate change and these are likely to be of high significance in a developing country context (Adger et al., 2007: 721).

A key tenet of the vulnerability-led approach is that it is context specific. Vulnerability-led adaptation is salient at a range of scales and suits a variety of purposes (McLeman and Smit, 2006). As identified by Downing and Patwardhan (2004: 71), "Vulnerability varies widely across communities, sectors and regions. This diversity of the "real world" is the starting place for a vulnerability assessment". A particularly important characteristic of the vulnerability-led approach is applicability to local scale analyses. The generation of scenarios is not the fulcrum of assessment and therefore limited applicability of model outputs at the local scale is not necessarily a hindrance to effective assessment. In a developing country context, especially, technological or top-down adaptation strategies are unlikely to successfully reduce vulnerability for those who are most at risk at the local scale, in the absence of a complementary bottom-up approach (O'Brien et al., 2004; Smit and Pilifosova, 2003).

Thus, the vulnerability-led approach to adaptation shifts the focus from biophysical impacts and discrete technological adaptations, towards socio-economic vulnerabilities in the development context. It is not surprising then, that vulnerability-led approaches bring adaptation closer to development processes. The concept of 'vulnerability', however, as applied in the climate change context has variable conceptualisations and the relationship between vulnerability and adaptation is not straightforward. This has implications for the extent to which vulnerability can actually be reduced using adaptation processes. The following section examines the variable understandings of vulnerability to climate change in relation to impacts-led and vulnerability-led adaptation approaches.

2.3 The vulnerability-adaptation complex

The purpose of this section is to analyse the concept of vulnerability (as it is applied in climate change adaptation research and practice) and its variable relationship with the concept of adaptation. To do this, I examine different applications of vulnerability, the related concepts of resilience and adaptive capacity and the contributions made by various antecedent disciplines (Adger, 2006).

The notion of vulnerability unfortunately faces many definitional issues when used in relation to climate change (Brooks, 2003). Interpretations of vulnerability may be classified in many ways and these are often incompatible (Fussel, 2007). "Vulnerability" is a term used colloquially in everyday English language. The Oxford English Dictionary defines "vulnerable" as to be "able to be hurt or wounded" (Hawkins et al., 1991: 733) and indeed, most interpretations in academic spheres implicitly or explicitly refer to vulnerability as the susceptibility to be harmed (Kelly and Adger, 2000; Turner et al., 2003; Ford and Smit, 2005; Wisner, 2006).

Climate change is a relatively new area of research bringing together researchers and practitioners from a wide range of fields such as climate science, natural

hazards, disaster management, food security, economics, and development studies (Brooks, 2003; Ford and Smit, 2005; Fussel, 2007). The assumptions underwriting different interpretations of vulnerability vary among research fields and scholarly communities and over time. Each discipline brings to the table its own theories of vulnerability, resultant of different research traditions and world views (McFadden et al., 2007). Cutter (1996: 530) attributes the discrepancies and divergences as arising from "different epistemological orientations…and subsequent methodological practices". In the context of community-led adaptation specifically, Yamin et al. (2004) stress the necessity of a common conceptual framework of vulnerability among disaster relief, development and climate change research communities. However, such a common language is lacking and these communities "operate tangentially or diametrically – not in tandem", (Yamin et al., 2004: 127).

The lack of shared meanings of vulnerability and adaptation has important consequences for how research is carried out and how the issue is addressed by policy makers (O'Brien et al., 2004). Schipper (2007; 2009) contends that the vulnerability-adaptation relationship is often misconstrued. Syntax is important in this regard. The relationship between adaptation and vulnerability can be construed in two ways:

a) Adaptation to climate change impacts reduces vulnerability; or

b) Vulnerability reduction enables adaptation to climate change impacts.

According to Schipper (2007) and Schipper and Burton (2009) these two constructions imply different things. The former – 'a' – implies that climate stimuli are an integral constituent of vulnerability and therefore, that reducing the impacts of climate stimuli ('adaptation') will reduce vulnerability to climate change. Within this interpretation, the root problem is climate change.

The latter – 'b' – suggests a far broader interpretation of adaptation (and vulnerability). This framing suggests a certain separation between 'vulnerability'

and climate change stimuli implying that vulnerability to climate change is related to conditions other than purely climate change impacts. Reducing vulnerability therefore achieves or facilitates adaptation to climate change impacts and requires addressing 'non-climate' conditions via development processes. Within this interpretation, the root problem is existing conditions creating susceptibility to climate change. Adaptation means something different depending on whether the relationship is construed as 'a' or 'b' above.

This differential interpretation of vulnerability in relation to adaptation matches 'end-point' ('a' above) and 'starting-point' ('b' above) vulnerability discussed above (Kelly and Adger, 2000; O'Brien et al., 2004; Fussell and Klein, 2006; Fussell, 2007; Ensor and Berger, 2009). The key conceptual differences are outlined in Table 4 below.

Table 4 Interpretations of vulnerability in climate change research, after Fussell (2007: 163)

	End-point interpretation	**Starting-point interpretation**
Root problem	Climate change	Social vulnerability
Policy context	Climate change mitigation, technical adaptation	Social adaptation, sustainable development
Main discipline	Natural sciences	Social sciences
Meaning of 'vulnerability'	Expected net damage for a given level of global climate change	Susceptibility to climate change and variability as determined by socioeconomic factors
Starting point of analysis	Scenarios of future climate hazards	Current vulnerability to climatic stimuli

It is evident that an end-point interpretation is roughly associated with an impacts-led approach to adaptation and that a starting-point interpretation is roughly associated with a vulnerability-led approach (Eriksen and Kelly, 2007; Fussell, 2005; 2007). As Schipper and Burton (2009) and Schipper (2007) caution,

however, this relationship is frequently misconstrued in mainstream contemporary adaptation discourse (even that adhering to a vulnerability-led approach), with particular consequences for the nature of adaptation activities. A certain disjuncture between scholarly discussions and policy debates regarding adaptation is particularly problematic in this regard as theory from academia regarding starting-point interpretations of vulnerability does not effectively infiltrate adaptation policy (and thus funding) (Schipper, 2009; Gaillard, 2010). Definitions are important, because: "… [different] definitions not only result in … different diagnoses of the climate change problem, but also … different kinds of cures" (O'Brien et al., 2004: 1). In the following sections I examine the content, backgrounds and consequences of end-point and starting-point interpretations of vulnerability.

2.3.1 End-point vulnerability: biophysical vulnerability

Vulnerability is frequently interpreted in climate research and policy as the net impacts of climate change remaining after adaptation has taken place. This can be represented as follows (after McFadden et al., 2007: 3):

Vulnerability = Impact – effects of Adaptation (V = I – A)

This interpretation is reflected in definitions of vulnerability such as the following:

> … the vulnerability of a given entity … with respect to Global Change may…be defined as the expected damage as resulting from the expected environmental perturbations in view of the expected transformation and adaptation processes (Corell et al., 2001, in Thywissen, 2006: 479).

Vulnerability is an end-point insofar as the ultimate impact or outcome of a climate hazard, after adaptation has taken place is the point of concern. In an impacts-led approach to adaptation, vulnerability is considered to be the 'residual' consequences remaining after adaptation measures have taken place

(Kelly and Adger, 2000; O'Brien et al. 2004; Smit and Wandel, 2006). This interpretation represents a strong scientific framework for understanding climate change vulnerability, impacts and adaptation.

For instance, Hay et al. (2003: 28) outline a systematic framework of vulnerability assessment for the Pacific Islands, to "characterize any residual adverse impacts", following the identification of impacts and adaptation efforts. This is depicted in Figure 3.

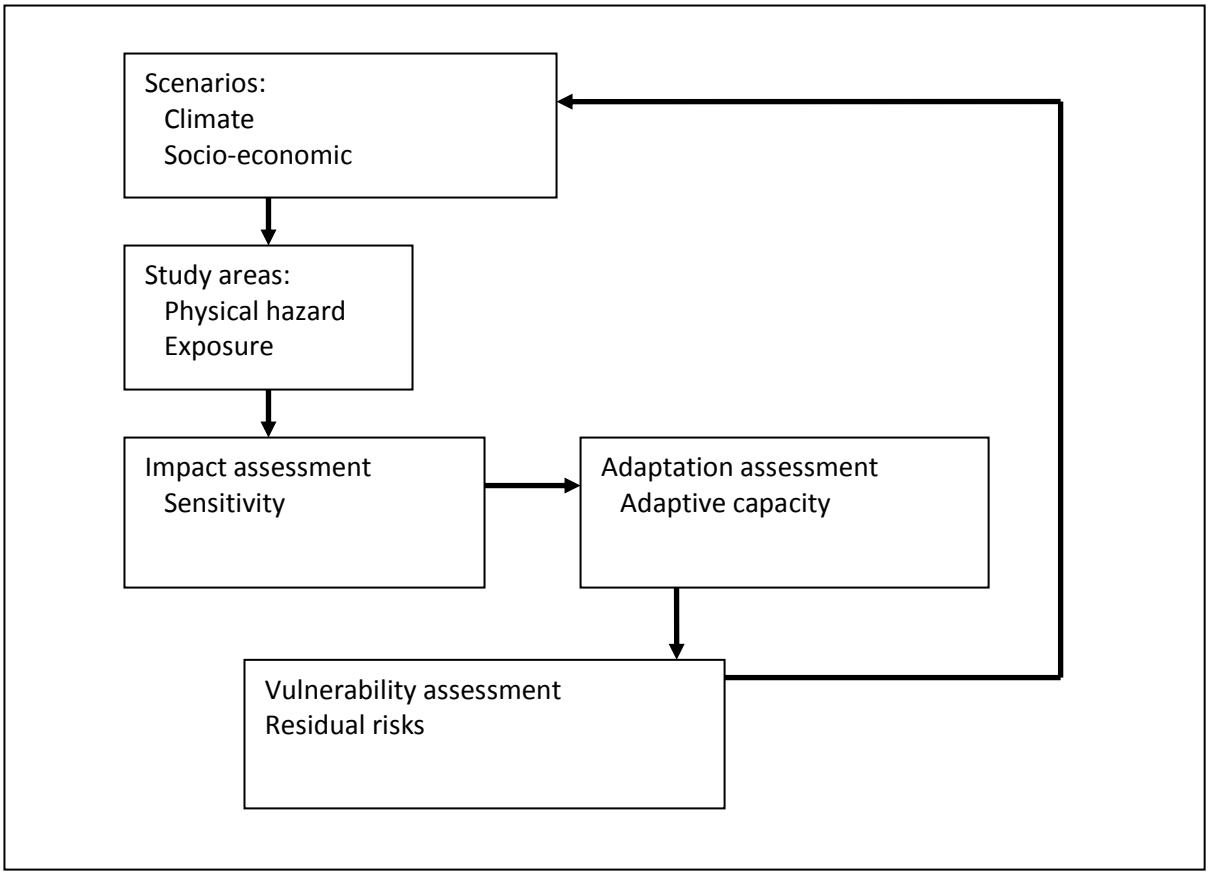

Figure 3 Framework for studies culminating in an assessment of vulnerability and adaptations to climate change, adapted from Hay et al. (2003: 28)

Vulnerability can be measured as the residual cost, or impact, remaining after the seven step impacts assessment process has been applied (Carter et al., 1994; Parry and Carter, 1998). As such, vulnerability is often framed in terms of measurable 'cost' indicators, where these may for example, be direct monetary costs, ecosystem losses, or human mortality. Vulnerability, therefore, is frequently interpreted as the net cost of climate change, whether this be

monetary, or other types of loss such as human life or property (Cutter, 1996; Alexander, 1993).

Importantly, as vulnerability is determined by exposure characteristics, responding to vulnerability requires modifying the conditions determining this exposure to reduce impact. Adaptation commonly involves technological measures – identified as 'fixes' by Eriksen and Kelly (2007: 505) – to minimise projected biophysical impacts, or "non-structural" measures such as moving people away from hazardous areas (Alexander, 1993). Examples are drought resistant seeds or infrastructure changes adjusted to projected changes in climate parameters (Eriksen and Kelly, 2007). These types of measures are commonly involved in the emerging adaptation 'mainstreaming' approach of 'climate proof' development, which involves reducing the risks to development projects or assets through adjusting activities and deliverables to account for projected climate impacts (Klein et al., 2007)[11]. Despite varying use of this popular term, a 'climate proofing' approach typically adheres to the vulnerability-adaptation relationship interpretation portrayed in 'a' in Section 2.3 above, where 'adaptation' is something additional to development that is done to reduce vulnerability (e.g. Kabat, et al., 2005). For example, the Asian Development Bank (ADB) developed an approach for climate proof development in the Pacific, to assist member states to adapt to climate change. Vulnerability is defined as:

> The extent to which a natural or human system is susceptible to sustaining damage resulting from climate variability and change, despite human actions to moderate or offset such damage (ADB, 2005: xiv).

[11] Although Schipper (2007) refers to climate proofing in a wider sense to indicate 'climate aware' development practice that can potentially reduce vulnerability, climate proofing is more commonly associated with adjustments to development deliverables according to projections of changes in climate parameters – thus adhering to a broad impacts-led approach.

O'Brien et al. (2004: 5) identify that under an end-point interpretation such as this, typically "what emerges is a list of activities that need to be funded: irrigation schemes, drought tolerant seed varieties, raised bridges, structural improvements in housing, and so forth". Process-based activities such as land use planning, emergency planning, and disaster relief and rehabilitation, can be added to this list (Alexander, 1993).

2.3.1.1 Exposure

This interpretation focuses primarily on exposure to physical climate hazards rather than on the ability of human systems to cope with physical hazard itself (Brooks, 2003). This interpretation of vulnerability therefore employs an "exposure model" (Cutter, et al., 2003: 242), meaning it is determined by a *physical hazard*, the extent of human *exposure* to the hazard, and *sensitivity* of a system to the impacts (Brooks, 2003). The emphasis is on the characteristics of the climate stimuli and the way they interact with the human system or biophysical systems that humans occupy.

Exposure is determined by a) the "magnitude, duration, impact, frequency and rapidity of onset" of the physical hazard and its probability of occurrence (Cutter, 1996: 532), b) the location and intensity of human activity or phenomena, and c) "the degree to which a system is modified or affected by perturbations" or its degree of sensitivity (Adger, 2006: 270). As stated by Smit and Wandel (2006), "exposure and sensitivity are almost inseparable properties of a system … and are dependent on the interaction between the characteristics of the system and on the attributes of the climate stimulus". In an end-point interpretation, vulnerability is inherently climate stimulus-specific or "specific to perturbations that impinge on the system" (Gallopin, 2006: 294). Accordingly, vulnerability is pinned to climate stimuli and their 'first order' or biophysical impacts (Brooks, 2003).

From this perspective, the geography of vulnerability is determined by the human occupancy of biophysical environments susceptible to hazards of a high

magnitude and frequency: “The most vulnerable people are considered to be those living in the most precarious physical environments” (Liverman, 1990: 29). From this perspective, a precise definition of the nature of the physical hazard is necessary to determine vulnerability (Kelly and Adger, 2000). As identified by Fussel (2007), the root causes are climate change stimuli and these are the primary focus of adaptive actions. Brooks (2003) considers that biophysical interpretations downplay the role of human systems in mediating the outcomes of physical hazard events, insofar as the ability of people to cope with events once they occur is de-emphasized.

2.3.1.2 Human ecology and the natural hazards paradigm

The end-point interpretation of vulnerability, as applied in the climate change field, grew from the natural hazards research paradigm that emerged in geography in the 1960’s and 1970’s (Adger, 2006; Janssen et al., 2006; Gaillard, 2010). This is underpinned by human ecology. Also referred to as the ‘risk-hazard’ framework (Fussel, 2005; 2007) this paradigm emphasizes the characteristics of physical stimuli and their interactions with human behaviour as the cause of vulnerability (Anderson, 2000; Heijmans, 2004). This view of vulnerability as a predominantly biophysical condition in relation to climate change has arisen largely from these interpretations within the natural hazards tradition (Fussel, 2007; Cutter, 1996; Brooks, 2003).

The influence of human ecology was fundamental to the shift in natural hazards research from a pure ‘nature as cause’ approach to a behavioral approach, pioneered by Gilbert White (1945) in the disasters research field. The behaviorists such as White (1945) and later, Burton and Kates (1964), Kates (1971) and Burton et al., (1978), “…concentrated their efforts on understanding the ways in which individuals and groups responded to disaster events” (Pelling, 2003b: 9), placing greater emphasis on the human dimensions of exposure in the natural hazards field, insofar as this included social perceptions of risk and behavioral adjustments such as land use planning (Watts, 1983; Anderson, 2000;

Mustafa, 2002; Handmer, 2003). Pre-dating natural hazards research, disasters were viewed as something to be engineered away or addressed by civil defense.

According to the Dictionary of Human Geography (Johnston et al., 2000: 352), "human ecology studies the relationships between people and their social and physical environments". The most notable contribution of the human ecological perspective in the natural hazards field is the explicit emphasis given to the *interactions* between human-environment systems as creating hazard. Turner and Robbins (2008: 297) specify that human ecology is: "either societal adjustment to the environment, largely applied to natural hazards, or the interaction of human culture with the environment".

From a human ecological perspective, rather than solely attributing the geography of hazard to the spatial distribution and frequencies of geophysical extremes, it is also a function of 'human-use systems' (Burton et al., 1978). The way in which humans use and/or change the physical environment causes vulnerability, as portrayed in Figure 4.

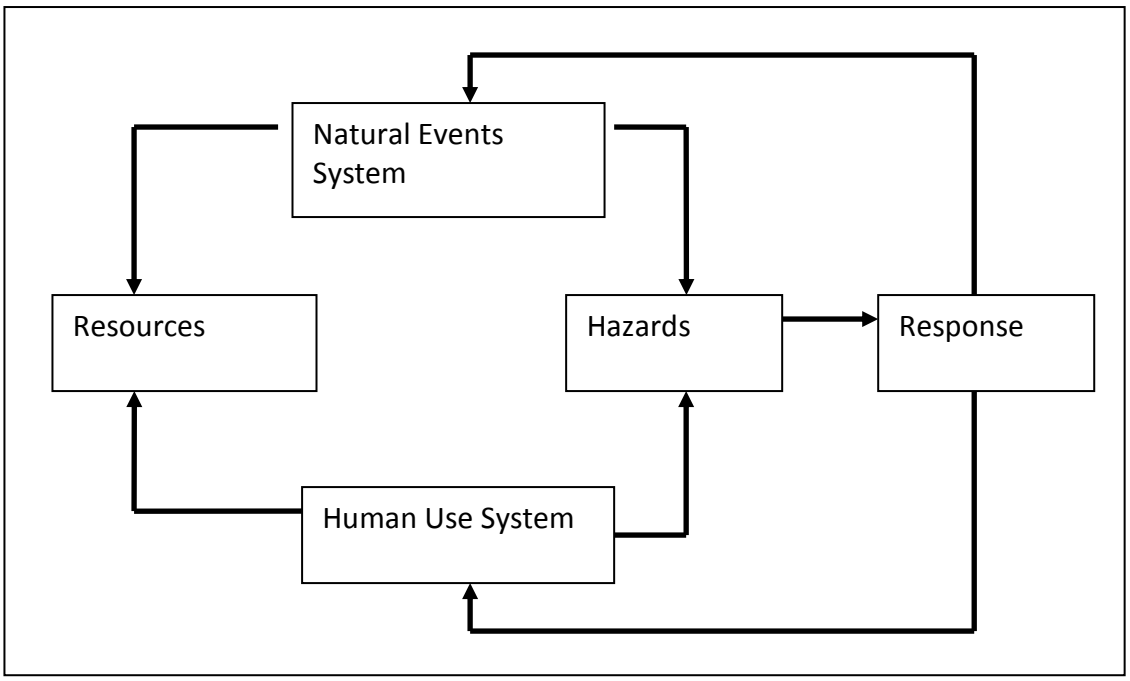

Figure 4 the physical and human dimensions of natural hazard and disaster, from Burton et al. (1978).

This recognizes, for instance, that a flood is not merely a consequence of increased storm frequency, but of decisions to use flood prone places (Smith, 1996). Addressing this therefore, involves not only engineering measures such as stop-banks, but land use planning and zoning initiatives: "Responding to those hazards, society may seek to modify the natural events system … and the human use system of locations, livelihoods and social organization" (Burton et al., 1978: 20).

Human ecology and natural hazards research makes the first step towards recognizing the "strategic import of social causality" (Watts, 1983: 240) in disaster. However, they do not generally recognize or address the "political and structural causes of vulnerability within society" (Adger, 2006: 271). Human use and/or modification of nature are the focus and vulnerability is a function of exposure to physical stimuli and biophysical impacts. Human ecology can be said to have acted as a springboard for later 'starting-point vulnerability' interpretations within the climate change field which stem from the vulnerability paradigm in natural hazards research (Gaillard, 2010) – a political ecology perspective (see Section 2.4 below). Impacts-led adaptation is based in a human ecology perspective.

2.3.2 Starting-point vulnerability: social vulnerability

Starting-point interpretations of vulnerability emphasise social[12] or 'non-climate' factors and processes as creating conditions where people are unable to effectively cope with or adapt to climate change. Vulnerability is a state that exists largely independently of specific physical hazards. Social conditions are the focus and starting point of analysis. A threat of some kind is necessary – people are always vulnerable 'to' something. Chambers' (1989) conceptualization of vulnerability is often cited in this regard:

[12] By social, I mean that which is not biophysical. 'Social' includes economic, cultural and political factors and processes.

> Vulnerability … has two sides: an external side of risks, shocks and stress to which an individual or household is subject; and an internal side which is defenselessness, meaning a lack of means to cope without damaging loss (Chambers, 1989: 1).

However, the specific nature of the threat that people are vulnerable 'to' does not necessarily determine the nature of vulnerability and therefore how to reduce it, as in an end-point interpretation. People can be vulnerable to a range of threats for the same social reasons (Allen, 2003). This is captured by Kelly and Adger (2000) in their oft-cited definition of social vulnerability which underpins most starting-point conceptualizations within the literature:

> The capacity of individuals and social groups to respond to, that is, cope with, recover from or adapt to, **any** external stress placed on their livelihoods and well-being" (Kelly and Adger, 2000: 325) [emphasis added].

The word 'any' is the key in this interpretation. Reducing vulnerability involves activities that increase the capacity of individuals and groups to respond positively to a *range* of current and future climate-related stresses. Different types of external threat will produce different manifestations of vulnerability, however, the focus of starting-point vulnerability is on the underlying factors causing it and these are mainly social (Allen, 2003). Although vulnerabilities vary in accordance with the threat, many of the factors shaping vulnerabilities are the same. Kelly and Adger (2000) describe this as the "wounded soldier" perspective; existing 'wounds' will limit the capacity to respond to a range of external stressors effectively, regardless of the exact nature of these external stressors. A wounded soldier in battle is highly susceptible to further attack, regardless of the weapon used.

This reflects what is commonly referred to as a 'multiple stressor' perspective, where vulnerability to climate change arises from a context[13] where multiple and interacting 'non-climate' factors and processes limit the ability to respond to a range of external stresses, of which climate change is but one (Turner et al., 2003; Reid and Vogel; 2006; Yohe et al., 2007; O'Brien et al., 2009; Silva et al., 2010; Ford et al., 2010). This broad perspective is also referred to as the 'double exposure' framework (developed by O'Brien and Leichenko, 2000), where the simultaneous processes of environmental change and globalisation create "local landscapes of vulnerability" (Silva et al., 2010: 6). Climate stress, when it occurs, 'unveils' a range of other stresses that impact livelihoods and wellbeing, such as poor access to services, restricted access to land, conflict, or disease (Reid and Vogel, 2006).

O'Brien et al. (2009) highlight that many approaches to vulnerability analysis identify specific outcomes of a singular or primary stressor, but that 'vulnerability to climate change' does not operate separately from vulnerability to a range of other stressors (this reflects the perspectives of participants in my research). Within a starting-point interpretation, although vulnerability to climate change is necessarily related to physical hazard, defining the specific nature of the likely impact is not always necessary or pertinent to determining the nature of vulnerability itself because vulnerability is shaped by multiple and interacting 'non-climate' processes. A starting-point interpretation engages primarily social science in analysis of problems and finding solutions to them; social systems are the center of analysis, and the focus of adaptive actions (Adger and Kelly, 1999; Kelly and Adger, 2000; O'Brien et al., 2004; Fussell, 2007). This is not to say that biophysical climate change impacts are not a problem or not important to consider in analysis. However, a starting-point interpretation recognises social

[13] Referred to as 'contextual vulnerability' by O'Brien et al. (2009) and 'situational vulnerability' by Wisner (2004).

conditions that shape differential impacts and shape differential ability to respond positively to these impacts among different groups of people.

In relation to adaptation, a starting-point interpretation of vulnerability adheres to relationship 'b' in Section 2.3 above – vulnerability reduction enables adaptation. Reducing social aspects of vulnerability has different implications for the 'shape' of adaptation from reducing biophysical aspects only. Although technological 'fixes' play a role in adaptation, initiatives for reducing starting-point vulnerability are largely 'social' rather than 'technical' in nature, focussing on the adaptive capacity of the human system in question (Eriksen and Kelly, 2007).

Given that vulnerability within a starting-point interpretation is shaped largely by 'non-climate' factors and processes, iinitiatives to reduce vulnerability are often indirectly related to climate change or seemingly unrelated to climate stress at all (Schipper, 2007; McGray et al., 2007). For example, reducing vulnerability may require reducing poverty, strengthening local livelihoods and improving health service provision. These are indistinguishable from regular development activities (Huq and Reid, 2007; McGray et al., 2007). Indeed, Smit and Wandel (2006), McGray et al. (2007), Hammill et al., (2005) and Rojas Blanco (2006), identify many initiatives, particularly at the local scale, that produce adaptive outcomes without the word 'adaptation' being explicitly used. These operate under the rubrics of, for instance, resource management, food security, sustainable livelihoods or community development (Smit and Wandel, 2006).

In theory, therefore, in a starting-point interpretation of vulnerability, vulnerability-led adaptation to climate change may be little different from sustainable development processes (Davidson et al., 2003). Climate change concerns however, are a 'catalyst' to better progress towards sustainable development, increasing the urgency of good development practice to reduce vulnerability (Wilbanks, 2003; Schipper, 2007).

2.3.2.1 Adaptive capacity and resilience

A starting-point interpretation of vulnerability puts more emphasis on people's capacity to *respond* to climate stimuli rather than their propensity to be *exposed* and *sensitive* to them. End-point interpretations tend to frame people affected as 'passive victims' ('exposed', 'sensitive') in the face of active threats and hazards (Campbell, 2003; Hilhorst and Bankoff, 2004). In contrast, starting-point vulnerability frames people as 'active agents' (Hewitt, 1983; Wisner et al., 2004) who are 'adaptive', possessing 'capacity' and 'resilience' with which to withstand and respond to climate change. Eriksen and Kelly (2007) note that a common question emerging from starting-point interpretations of vulnerability to climate change is "what can be done to strengthen people's own capacity to respond and adapt?", rather than "what can be done to protect the population?" as in an end-point interpretation (Eriksen and Kelly, 2007: 505). Most conceptualisations of vulnerability in the social science sphere relate in some way to people's capacity to cope with stress (Brooks, 2003; Eriksen et al., 2005).

Much research on vulnerability to climate change, particularly in a developing country context, focuses on weaknesses that exacerbate exposure (Barnett and Adger, 2003; Barnett and Campbell, 2010). A primary focus on response capacity explicitly recognises human ability to manage exposure, rather than exclusively viewing people as 'victims' of biophysical and socio-economic processes (Adger et al., 2003; Gaillard, 2010). Starting-point interpretations recognise that societies have developed and employed mechanisms and strategies for coping with climatic variability and extremes (and other physical hazards and stresses) for centuries (Hay et al., 2003; Yamin et al., 2004; Adger and Vincent, 2005; Heijmans, 2004; Campbell, 2006). In the climate change context specifically, this potentially moderates notions of fatalism that can prevail from vulnerability interpretations that over-emphasize exposure (Barnett, 2001).

Adaptive and coping capacity

Starting-point vulnerability focuses primarily on the factors and processes shaping the ability of human systems to respond to a range of physical hazards and stresses rather than on the exposure characteristics of the hazard itself (Brooks, 2003; O'Brien et al., 2004). In the climate change field, this is commonly referred to as adaptive capacity; vulnerability and adaptive capacity are integrally linked (Smit and Pilifosova, 2001; Smit and Pilifosova, 2003; Grothmann and Patt, 2005; Brooks and Adger, 2004; Smit and Wandel, 2006; Adger et al., 2007; Ensor and Berger, 2009). The general consensus in the literature is that enhancing adaptive capacity reduces vulnerability and vice-versa.

'Adaptive capacity', as applied in the climate change field, is derived from previous applications of the concept of 'capacity' in the disasters literature (Davis et al., 2004; Wisner et al., 2004). Capacity refers to two things (Gaillard, 2010: 220):

a) The resources and assets people possess to respond to hazards, and,

b) The ability to use and access the necessary resources.

Thus, adaptive capacity refers to not only to resource and asset availability, but to the social and political structures through which distribution of resources takes place (Nelson, et al., 2007; Ensor and Berger, 2009).

Smit and Pilifosova (2003) describe adaptive capacity as the ability to a) prepare for, b) avoid or moderate and c) recover from, the effects of exposure. Like the concept of vulnerability more broadly, however, interpretations of adaptive capacity vary among the climate change researchers, particularly in regard to how it differs from *coping* capacity, a concept applied in the disasters field (Thywissen, 2006). Some authors attribute coping capacity to shorter term responses to climatic variability and extremes, and adaptive capacity to longer

term adjustments (Smit and Wandel, 2006; Vasquez-Leon et al., 2003; Berkes and Jolly, 2001). Gaillard (2010) refers to coping strategies as an expression of capacity; as the ways in which capacities are mobilised in times of crisis. The APF defines adaptive capacity as:

> … the property of a system to adjust its characteristics or behaviour in order to expand its coping range under existing climate variability , or future climate conditions (Brooks and Adger, 2004: 168).

This interpretation is in line with Bohle et al. (1994) who state that adaptive capacity is the present ability of a human system to cope with stress, which is an important indicator of its capacity to adapt to future stress, and Brooks' (2003: 8) observation that it refers to "adjustments in a system's behaviour and characteristics that enhance its ability to cope with external stresses".

Building adaptive capacity is a key component of adaptation within a vulnerability-led approach. The emphasis of analysis is usually on the factors and processes that determine and constrain adaptive capacity and these are frequently framed in the literature as being a product of people's everyday risks, arising from everyday life (Few, 2003; Allen, 2003; Lavell, 2004; Reid and Vogel, 2006; O'Brien et al., 2009; Lopez-Marrero, 2010).

The factors and processes shaping adaptive capacity are context and scale dependent. Smit and Wandel (2006) and Brooks and Adger (2004), emphasise there can be no certain or universal determinants of adaptive capacity beyond broad categories, because these exist and function differently in different contexts. However, broad types of factors and processes that determine adaptive capacity are classified throughout the literature. Factors and processes that are commonly referenced include: social institutions and networks, governance structures, political rights, risk perceptions, education, literacy, skills, traditional knowledge, information flows, and health (Adger and Kelly, 1999; Smit and Pilifosova, 2001; Yohe and Tol, 2002; Adger et al., 2003; Ford and Smit, 2004; Brooks and Adger, 2004; Adger and Vincent, 2006; Adger et al., 2007;

Lopez-Marrero, 2010; Nelson et al., 2010). Importantly, adaptive capacity – like starting-point vulnerability more broadly – is 'nested' (Smit and Wandel, 2006). Local scale determinants are shaped by higher scale factors and processes at a national, regional and global level (see Figure 5).

These determinants are frequently classified as either generic or specific, depending on their relation to particular climate change impacts (Handmer, 2003; Brooks and Adger, 2004; Huq and Reid, 2004; Adger and Vincent, 2005; Adger et al., 2007). Generic factors are those operating at a broader scale such as economic wealth, livelihoods, education levels, health, literacy and governance that affect vulnerability. Specific factors are those that operate in response to the specific nature of a hazard. These may be factors such as available technology, and extent of information. For instance, cyclone warning systems and weather resistant buildings are integral to adaptive capacity in many parts of the word (Handmer, 2003). Generic and specific determinants are integrally linked, because specific determinants are often influenced strongly by generic factors (Handmer, 2003; Brooks and Adger, 2004; Adger et al., 2007). The factors influencing adaptive capacity are interdependent, and individual determinants can rarely be isolated (Adger and Vincent, 2005; Smit and Wandel, 2006).

The determinants of adaptive capacity facilitate or constrain the development, evolution and deployment of adaptive strategies in a society. Evidentially, the factors and processes influencing adaptive capacity (particularly generic ones) coincide with those that facilitate and constrain sustainable development; "the factors that determine a country's ability to promote (sustainable) development coincide with the factors that influence adaptive capacity relative to climate change, climate variability and climatic extremes" (Yohe et al., 2007: 816). Adaptive capacity and development cannot be considered separately. Likewise, vulnerability reduction and development cannot be considered separately.

The nested nature of adaptive capacity in the Canadian Arctic

The following figure is simplified from Ford et al. (2007:158), showing the cross-scale linkages between determinants of an element of adaptive capacity – traditional knowledge – important to managing hunting risks in Inuit communities.

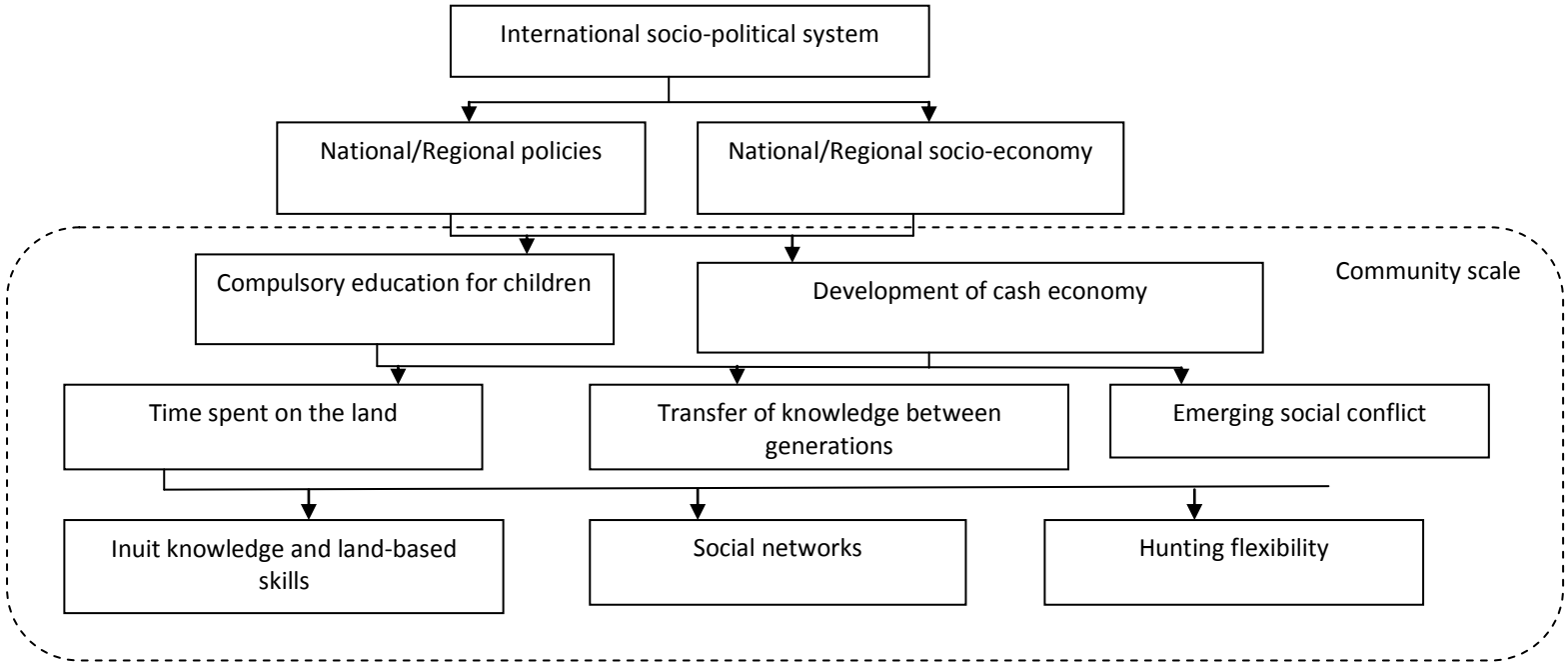

Figure 5 Factors influencing adaptive capacity in Arctic Bay and Igloolik, after Ford et al. (2007:158)

Resilience

The term 'resilience' is being increasingly applied in relation to climate change adaptation (Nelson et al., 2007; Ensor and Berger, 2009). The concept of resilience originated in ecology (Holling, 1973) with applications in the disasters literature from the 1970's (Gallopin, 2006; Smit and Wandel, 2006; Turner et al., 2003; Pelling and Uitto, 2001; O'Brien et al., 2006; Gaillard, 2010). Resilience and adaptive capacity are closely linked and the differences between the two concepts are in no way clear. Gallopin (2006) reviews the different ways in which resilience is linked to adaptive capacity and vulnerability across disciplines, revealing that there is little consensus as to the specific relationship between resilience and adaptive capacity, or between resilience, vulnerability and adaptation to climate change. Manyena (2006) goes further to say that the application of resilience in the social sciences in general is conflicting and as such does not yet provide a comprehensive framework for practice.

Smit and Pilifosova (2003) identify adaptive capacity as reflecting the resilience, (as well as stability, robustness, and flexibility) of a system. Similarly, Barnett (2001: 10) frames resilience as a 'subset' of adaptive capacity: "the pursuit of resilience is integral to the development of adaptive capacity". Conversely, Nelson et al., (2007) frame adaptive capacity as a core feature of resilient systems. Ensor and Berger (2009) differentiate adaptive capacity from resilience:

> …adaptive capacity…[is] understood as the ability to change in response to climate changes, and resilience [is] understood as the ability to absorb or cope with the unexpected.

Resilience, like adaptive capacity, is often framed as the antonym of vulnerability (Gallopin, 2006; Fussel, 2007), but as noted by Gallopin (2006) this is unclear; while increasing resilience reduces vulnerability, an antonym of vulnerability would imply the ability to simply *resist* change, rather than change state with it.

The ability to change states is the key attribute of a resilient system. Resilience reflects the dynamic nature of adaptive capacity, because it implies the ability to return to an acceptable level of functioning and structure, following a perturbation. To be acceptable, this state need not have the same characteristics as the state preceding the perturbation; this is the key to social science applications of resilience, that systems can change states if this is needed to maintain an acceptable level of structure and functioning (Fussel, 2007; Gallopin, 2006; Manyena, 2006). In this way, a resilient system is generally considered to be flexible, in that it is well equipped to "learn from, and reorganize to meet, changed conditions" (Barnett, 2001: 10). A resilient system therefore, is able to shift its coping range to suit changing conditions such as those resulting from climate change. In this way, the ability of a system to absorb rather than resist stress is emphasised.

The ability to be flexible in the face of uncertainty and surprise is generally the meaning attributed to resilience in the climate change sphere. This implies the ability to learn, re-organize, innovate and transform in the face of changing environmental conditions, based strongly on social factors. Adaptive capacity is often used similarly, but frequently indicates stronger links to specific climate impacts (experienced or anticipatory)[14].

In the context of adaptation to climate change, Nelson et al., (2007) contend that managing systems for flexibility rather than for stability is important since the type and magnitude of change is not always predictable. Building resilience therefore develops sources of resilience (e.g. self-organisation, capacity for learning) in order to maintain flexibility and generate robustness to uncertainty. End-point interpretations of vulnerability tend to emphasise resistance rather

[14] These insights are based on discussions with the 'terminology and concepts group' at the Third International Conference on CBA (Charles Erhart, Kathleen Dietrich, Anna Taylor, Rachel Berger, Christina Ruiz and Terry Cannon).

than resilience, in that measures to protect against impacts are the focus, rather than measures to increase flexibility to insure against uncertain impacts. Regardless of the specific relationships between resilience and adaptive capacity building both reduces vulnerability within a starting-point interpretation.

2.4 The vulnerability paradigm in disasters research: political economy, political ecology and constructivism

As discussed above, starting-point interpretations of vulnerability within the climate change adaptation sphere bring attention to the capacity of people to respond to climate change through focusing on adaptive capacity and the related concept of resilience. This is shaped primarily by social, rather than biophysical or climatic, processes operating in specific contexts. Focusing on the response capacity of people therefore emphasizes questions about *why* some groups may have more or less capacity to respond than others; what factors and processes facilitate and constrain the capacity to adapt? The answers (within a starting-point interpretation) are in the socio-economic and political structures in society that shape differential access to resources with which to secure livelihoods and therefore shape adaptive capacity and resilience. A key research question within this field is: "what political and economic arrangements accelerate or decelerate reductions and enhancements in human vulnerability … ?" (Turner and Robbins, 2008: 300). Analysis adhering to this conceptual approach therefore aims to be 'explanatory' rather than 'descriptive' as in an end-point framework (Fussell, 2005; 2007).

Within the climate change context, starting-point vulnerability is derived primarily from the 'vulnerability paradigm' in disasters research (Gaillard, 2010), which has strong ties with studies of vulnerability as lack of entitlements (e.g. Sen, 1981; Dreze and Sen, 1989; Bohle et al., 1994) and studies of vulnerability in relation to poverty and sustainable livelihoods (e.g. Hamill et. al, 2005; Chambers and Conway, 1992; Reid and Vogel, 2006) (Pelling, 1999; Brooks, 2003; Ford and Smit, 2004; Adger et al., 2003; Janssen et al., 2006; Adger, 2006; van Aalst et al.,

2008; Gaillard, 2010). These three antecedent traditions make similar assumptions about the causal structure of vulnerability and are underpinned by the theoretical traditions of political economy, political ecology and constructivism. All examine the role of inequality, (under)development, economic and political power and cultural norms in shaping the differential vulnerability of groups of people.

2.4.1 Vulnerability paradigm

Disasters began to be prominently viewed through a vulnerability lens in the 1970s and 1980s in response to critiques of the dominant natural hazard or risk-hazard, impact-reduction approach (Hilhorst and Bankoff, 2004). This brings consideration of disasters away from hazards themselves and towards structural constraints (social, cultural, economic and political) inherent in the 'normal' functioning of society (Hewitt, 1983; Watts and Bohle, 1993, Bohle et al., 1994; Cutter, 1996; Pelling, 2003a; Wisner et al., 2004). The central tenet is that disasters highlight the constraints and problems present in everyday life; "disasters are perceived as extensions of the problems confronted in 'normal' or 'daily' life (Wisner, 2004: 186). Thus, disasters are considered to be *within* the regular social fabric of life rather than *outside* it – 'exceptional events' – as in the natural hazards paradigm (Wisner, 2004; Gaillard, 2010).

This paradigm was pioneered by O'Keefe et al., (1976) who 'took the naturalness out of natural disasters' in a seminal article in *Nature* (vol. 260), arguing that "disasters are more a consequence of socio-economic than natural factors" (O'Keefe et al., 1976: 556). Also frequently referenced in the literature as highly influential are chapters in Hewitt (1983), and more recently Blaikie et al., (1994), revised as Wisner et al. (2004). All approach vulnerability to disaster as a condition existing independently of hazard; "disasters are essentially social happenings" (Allen, 2003: 174). This type of approach is often referred to as 'structuralist' as opposed to 'behaviouralist' (Liverman, 1990; Susman et al., 1983; Turner and Robbins, 2008). Structuralists interpret the chain of disaster

causality as running from social to biophysical factors, focussing on the distal roots of local problems rather than interpreting social causality as behaviour linked to specific hazards (Hewitt, 1983a). As stated by Cutter (1996: 533):

> This perspective highlights the social construction of vulnerability, a condition rooted in historical, cultural, social and economic processes.

Vulnerability reflects marginalisation in daily life (Wisner et al., 2004).

The disaster explanation frameworks developed by Wisner et al. (2004) are widely cited as influential to a social conceptual framework of vulnerability in the disasters and climate change field (e.g. Cutter, 1996; Twigg, 1998; Cutter, 2003; Adger and Kelly, 1999; Kelly and Adger, 2000; Allen, 2003; Few, 2003). Wisner et al.(2004) explicitly separate, social and physical elements of hazard in order to emphasise social causation, defining vulnerability as:

> … the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (an extreme natural event or process) (Wisner et al., 2004: 11).

Their focus is on the social causation of disasters as:

> … the product of social, political, and economic environments (as explicitly distinct from the natural environment), because of the way these ultimately structure the lives of different groups of people (Wisner et al., 2004: 4).

This is exemplified in their 'Pressure and Release Model' (PAR) (Figure 6) built upon in the 'Access Model', explaining the causal chain of disaster as contingent on social structures.

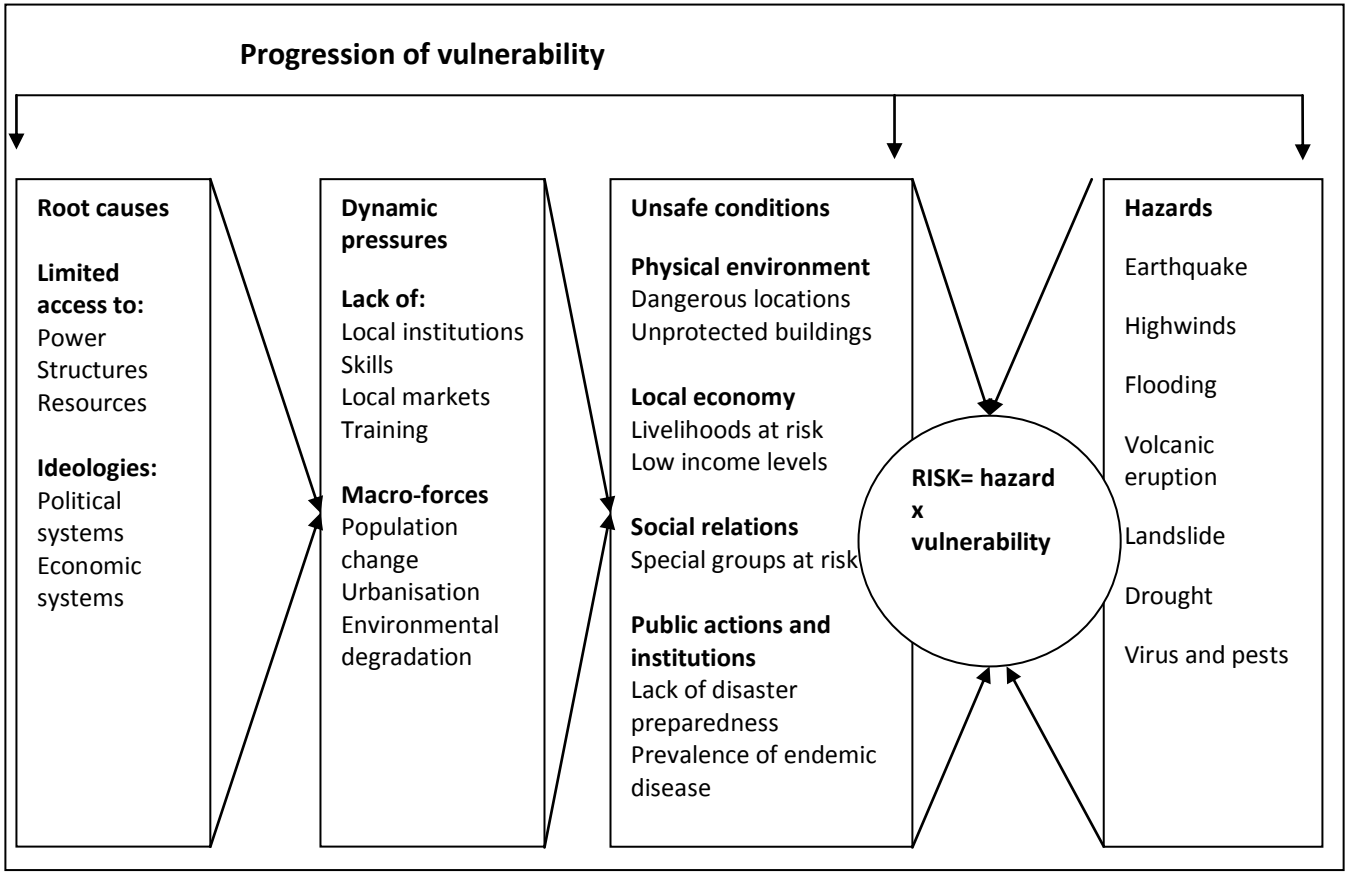

Figure 6 Pressure and Release (PAR) Model: the progression of vulnerability, after Wisner et al. (2004: 51)

Wisner et al. (2004) propose that vulnerability has

> … three sets of links that connect the disaster to processes that are located at decreasing levels of specificity from the people impacted upon by the disaster (Wisner et al., 2004: 52).

As specified by Smit and Wandel (2006), in the context of climate change, vulnerability is a 'nested hierarchy' with local scale determinants linked to higher scale processes. The most distant of these are 'root causes', or widespread economic, social, cultural and political processes – including ideologies – affecting the allocation and distribution of resources and power among different groups of people. Root causes translate into more specific 'dynamic pressures' such as population changes, urbanization and conflict, as well as export promotion and natural resource extraction activities. These dynamic pressures, although not necessarily negative or 'vulnerability-inducing' in themselves, can generate locally specific 'unsafe conditions' for some social groups. Unsafe conditions are the specific consequences of dynamic pressures when a particular physical hazard occurs, and are manifest in temporally and spatially specific access to resources by various social groups such as children, women, or particular ethnic groups. Vulnerability is separate from physical hazard in the PAR model, however, disaster occurs when social vulnerability intersects with a physical hazard, or 'trigger event'. The vulnerability of a human system to disaster is the place and time-specific manifestation of wider social, economic and political processes.

The vulnerability paradigm brings disasters within the realm of development – it is development failures, not hazards, which create disasters (Cuny, 1983; Hewitt, 1983a,b; Watts, 1983; Anderson and Woodrow, 1989). Rather than reflecting 'natural stimuli' or human behaviour and perceptions in relation to these, disasters reflect development failure; the root causes of vulnerability are the same as the root causes of other development-related problems. Thus, the vulnerability perspective and the placement of disasters within development

processes, is well established in the disasters field. Consequently, the theoretical principals are infiltrating (to a degree) international policy such as the UNISDR (2005). Although approaches to disaster risk reduction incorporating the key tenets of this paradigm are established in practice – in particular, community-based disaster risk reduction (CBDRR) – much of this still reflects a natural hazard paradigm with technocratic measures dominant (Heijmans, 2009; Gaillard, 2010). Heijmans (2009) notes a separation between rhetoric and practice in this regard as although many organisations involved in CBDRR espouse vulnerability reduction in their policies, initiatives in practice tend to be 'depoliticised'.

Entitlements

The theory of entitlements developed by Sen (1981) in the context of poverty and famines is central to much social vulnerability research across disciplines (Janssen et al., 2006; Olmos, 2001; Adger, 2006). Entitlements theory marked an important turning point in considerations of the causal structure of famine (Downing, 2003). Instead of considering famine and food insecurity as a product of predominantly drought and crop failure, Sen (1981) framed famine as a result of 'entitlement failure'. Entitlement failure is the inability to mobilize the economic and social resources necessary to access food and cope with adverse conditions such as drought and crop failure. Famine therefore, is a result of both the demand for food and the social and economic ways in which food is obtained (Adger, 2006). This emphasizes both the availability of 'entitlements' or resources and the ability of individuals to call on these resources in constructions of vulnerability to food insecurity and famine. Importantly, this highlights the fact that local-scale vulnerability is contributed to by processes such as market forces and policy trends that have broad-scale resonance and origins, and are outside the direct control of individuals, households and communities.

The concept of entitlements is further developed and applied in the context of vulnerability to climate change by, notably, Watts and Bohle (1993), Bohle et al., (1994) and Adger and Kelly (1999). As stated by Adger and Kelly (1999):

> The social differentiation of entitlements are not constrained in their analysis to those institutions of the state but extend more widely to include both formal political structures…and social and cultural norms (Adger and Kelly, 1999: 257).

This is recognized as 'expanded entitlements' by Dreze and Sen (1989). Importantly, this recognizes the constraints placed on access to resources by endogenous as well as exogenous social structures. Entitlements are determined by an individual's position or place of power in an internal as well as external social hierarchy (Liverman, 1990).

According to Bohle et al. (1994), the concept of entitlements includes cultural and intra-familial entitlements to resources as well as encompassing wider structures of empowerment by which these entitlements are secured and contested. Entitlements therefore, extend beyond material and economic measures of well-being to encompass the multitude ways in which resources necessary for well-being are accessed, distributed, and contested over space and time (Kelly and Adger, 2000). Access to entitlements denotes the options that individuals, households, communities and social groups have available to them to minimize the negative impacts of climate change and take advantage of the opportunities.

Sustainable livelihoods and vulnerability to poverty

Many approaches to vulnerability in the hazards field, in particular, draw on conceptualisations of vulnerability within the sustainable livelihoods and poverty field. This field contributes, among other things, an explicit focus on local livelihoods and the ways in which livelihood choices and options are enabled and constrained by wider processes. The Sustainable Livelihoods Approach (SLA) originally developed by Chambers and Conway (1992) is a framework for understanding vulnerability to poverty. However, this has been applied in many contexts, and is often cited as influential to framings of social vulnerability in the hazards field (Birkmann, 2006; Few, 2003) and climate change context (Hamill et

al., 2005; Downing, 2003; Reid and Vogel, 2006; Klein et al., 2007). A commonly accepted definition of livelihood is given by Chambers and Conway (1992: 7): "a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living". The SLA is aimed at identifying ways in which (mainly) rural livelihoods are vulnerable to external stresses and shocks – natural or otherwise (Adger, 2006; Hamill et al., 2005; Downing, 2003; Birkmann, 2006; Yamin et al., 2004). The focus is mainly at the local scale.

In line with much of the disasters literature, the sustainable livelihoods and poverty literature emphasise the nature of daily existence as shaping vulnerability to environmental stress. Wisner (2004: 190) contends that situations creating vulnerability are "rooted in the routines, opportunities and limitations of 'normal' or 'daily' life". Lavell (2004) terms this 'everyday vulnerability' or 'lifestyle vulnerability': "vulnerability to disasters and lifestyle vulnerability are part of the same package" (Lavell, 2004: 72).

Throughout entitlements, natural hazards and disasters, and sustainable livelihood based approaches, an either explicit or implicit assumption is that poverty and vulnerability to environmental stress are in some way equated. While biophysical interpretations emphasise exposure to physical hazard, social interpretations emphasise factors such as marginalization, inequality, food entitlements and access to resources – factors generally associated with or caused by poverty. Although this depends on the definition of poverty itself (Hamill et al., 2005; Bohle et al., 1994), suffice to say poverty can be correlated with vulnerability because of its direct association with access to resources (Adger, 1999; Wisner et al., 2004). Poverty is sometimes addressed as a cause of vulnerability (e.g. O'Brien et. al, 2004). Conversely, vulnerability is also conceptualized as the cause of poverty – as the factors that generate and maintain a condition of poverty (e.g. Yamin et al., 2004). Vulnerability to environmental stress itself can act to exacerbate poverty in a self-perpetuating cycle (Yamin et al., 2004, Delica-Willison and Willison, 2004). However, it is

generally accepted that poor people are likely to be more exposed to physical hazard and possess less adaptive capacity to respond to it, because they have fewer choices about where and how to make a living. Few (2003) identifies that the poor are more likely to occupy an environment where the consequences of flooding will be most severe, for example. Adger (1999) uses poverty as a proxy indicator of baseline individual and household vulnerability to climate extremes in coastal Vietnam. In this case study, poverty is directly linked to marginalization and lack of access to resources critical for resilient livelihoods in the face of climate extremes.

Most significantly a condition of poverty generally means fewer resources are available with which to cope with and recover from environmental stress. As Liverman (1990: 32) emphasizes: "the most vulnerable people may not be in the most vulnerable places – poor people can live in productive biophysical environments and be vulnerable, and wealthy people can live in fragile physical environments and live relatively well". This highlights a major shortcoming of biophysical interpretations of vulnerability in that the "texture of vulnerability remains hidden" (Stephens, 2004: 100) in vulnerability indicators based on the most highly exposed physical and human systems, such as drought prone regions or low-lying coastal areas.

However, Few (2003), Pelling (2003b) and Yamin et al. (2004), caution against "routinely equating vulnerability with poverty" (Few, 2003: 49), due to the highly complex mesh of factors creating social vulnerability. Blanket indicators of income-related poverty can conceal the highly differential nature of vulnerability at the local scale (Hamill, et al., 2005). Therefore, although it can generally be said that at a broad scale, poorer countries, regions or social units are more vulnerable than wealthier ones, those who are 'poorest' may not necessarily be the most vulnerable at the local scale (Bohle et al., 1994). Poor groups of people are more likely to have to accept greater vulnerability to minimise poverty on a daily basis (Pelling, 2003a). At the local scale, vulnerability is multi-dimensional,

and dependent on a raft of factors such as the strength of social networks and institutions, gender issues and beliefs or customs (Bohle et al., 1994; Wisner, 2004; Allen, 2003; Cutter, 2003).

2.4.2 Political economy, political ecology and constructivism

The vulnerability paradigm and its related traditions of entitlements and vulnerability to poverty are widely underpinned by political economy, political ecology and social constructivism. These theoretical frameworks underpin most starting-point, social interpretations of vulnerability to climate change, as most explicitly or implicitly allude to marginalization, poverty, inequality and (under)development as key factors and processes determining the vulnerability of particular individuals, groups and systems. For example, Schipper and Pelling (2006) directly attribute disaster to "development failure" insofar as this increases the prevalence and occupation of physically vulnerable environments. 'Mainstream' development is critiqued for generating marginalisation, poverty or 'entitlement failure' of various social groups and this is seen as both a symptom and a cause of vulnerability. The negative effect of 'top-down' development on local communities is sometimes referred to as 'development aggression' (Heijmans, 2004).

The consequence of the application of these theoretical traditions in vulnerability research across fields is the fundamental recognition of access to, and allocation of, assets in society (Pelling and Uitto, 2001). The overarching point of departure from earlier human ecology perspectives is that the emphasis is placed upon structural constraints to choice (such as labour markets, political systems) rather than the perceptions and behaviour of resource users in isolation (Fussel, 2007). Within a political economy, political ecology or constructivist framework, vulnerability is ultimately a product of the forces that constrain or facilitate behavioral choice. These frameworks therefore make a stronger link between the "ongoing social order" and environmental hazards (Blaikie and Brookfield, 1987: 23). Obviously, this perspective is complementary to human

ecology in explaining differential vulnerability in geographical and social space (Mustafa, 2002).

In general, political economic, political ecological and constructivist perspectives underpin the structural vulnerability paradigm of natural hazards research, building on earlier human ecological perspectives underpinning the natural hazards behavioral paradigm. This broadly mirrors the theoretical traditions underpinning end-point, impacts-led adaptation and starting-point, vulnerability-led adaptation. The former is human ecological while the latter is political economic, political ecological and constructivist.

2.4.2.1 Political Economy

Political economy provided the roots for political ecology. Political economy underpins much of entitlements and sustainable development and poverty research (Fussel, 2007). According to the Dictionary of Human Geography, political economy examines the production and accumulation of wealth ('economy') and the distribution and allocation of wealth among classes ('political') (Johnston et al., 2000). The core premise therefore, is that 'economy' does not operate separately from 'politics'. The economy (which means 'social economy' as well as merely 'money') is based within the mode of production, constitutive of productive forces (labour, resources and technology) and the relations of production (power, regulation and control) (Peet and Thrift, 1989). The political economy approach is also known as neo-Marxist, having originated in the works of Karl Marx and Adam Smith (Liverman, 1990; McLaughlin and Dietz, 2008).

Marx's legacy is strong in studies of social vulnerability; political economy conceptualises vulnerability as a class phenomenon (Pelling, 2003b). This is the basis of O'Keefe et al. 's (1976) seminal article that accelerated the vulnerability paradigm in disasters research; "the recent [1976] earthquake [in Guatemala]…is no longer identified as a natural event – local inhabitants who survived are referring to the event as a "classquake"" (O'Keefe et al., 1976: 566). According to

political economy or neo-Marxism, vulnerability to environmental stress is caused primarily by social relations and political and economic power, with class as the overriding determinant of differential vulnerability (Liverman, 1990; Bohle et al., 1994). Processes of marginalisation are central to producing vulnerability (Susman et al., 1983). Susman et al. (1983) attribute vulnerability directly to a perpetual state of 'underdevelopment' of socially marginalized groups. This is based largely on a dependency theory of core-periphery relations of production associated with capitalism. Issues such as labour exploitation and flows of resources within particular regions have made the poor particularly vulnerable.

Entitlements theory draws on political economy in that the entitlement of a household to call on resources is ultimately determined by power or position in a social structure (Adger and Kelly, 1999; McLaughlin and Dietz, 2008). For example, Winchester et al., (2007) examine the social vulnerability of households in coastal Andhra Pradesh. Wealthier households cope with uncertain climatic variability by "keeping in" with powerful and influential individuals. This allows them more ability to diversify their assets. In other words, they "nurture their place in the local political economy" by securing their place in local social networks (Winchester et al., 2007: 167). Concurrently, poor households attempt to ingratiate wealthier households and other influential individuals higher in the social hierarchy. For poorer households, this does not so much increase their coping ability, as help prevent further erosion of it.

In the context of climate change, O'Brien and Leichenko (2000) identify that globalization processes have inherently unequal implications for the well-being of different regions, countries and social groups. The process of economic globalization fundamentally shapes who 'wins' and who 'loses' from the effects of climate change. They identify that those most marginalized by globalization are those likely to be worst affected by climatic changes due to restricted access to resources and assets necessary to reduce exposure to, and cope with, climatic changes and extremes (Olmos, 2001).

The key tenet of political economy is that it is not necessarily the presence or absence of resources at an aggregate level that determines differential ability to cope with stress, but the distribution of resources among uses and users (Blaikie, 1985). Winchester et al. (2007) propose that the political economy of vulnerability is a product of decision-making arenas concerning resource distribution and allocation. Patterns of distribution are often embedded in a 'macro-structure' operating at the national and international level (Bohle et al., 1994)

2.4.2.2 Political Ecology

Political ecology does not possess the disciplinary definition of political economy or human ecology (Johnson et al., 2000). However, as identified by Forsyth (2003), work broadly defined as 'political ecology' shares consideration of the "social and political conditions surrounding the causes, experiences, and management of environmental problems" (Forsyth, 2003: 2). Political ecology is described by many as a synthesis of political economy and human ecology approaches to the relationships between nature and society (Pelling and Uitto, 2001; Bohle et al., 1994). The works of Blaikie (1985) and Blaikie and Brookfield (1987) marked the commencement of a definitive use of the term 'political ecology' (Turner and Robbins, 2008). As Blaikie and Brookfield (1987: 17) state: "The phrase political ecology combines the concerns of ecology and a broadly defined political economy".

Political ecology diverges from political economy in that it considers the environment as an independent variable structuring social relations. That is, political ecology recognises the role of 'nature' in shaping society and social change. This notion is largely dismissed in political economy which focuses primarily on the dynamics of capitalist economic structures as degrading environments, largely ignoring the role played by the 'non-human' environment itself (Greenberg and Park, 1994; Berkes, 2008). This was an early impetus for the rise of the broadly defined political ecology tradition (Greenberg and Park,

1994; McLaughlin and Dietz, 2008). Further, political ecology diverges from human ecology as human ecology broadly addresses environmental degradation through the lens of human exploitation of, and domination over, 'nature'. From this perspective, it is the unsustainable human use of natural resources, as derived from economic capitalist systems that causes environmental degradation. The key to minimising environmental degradation therefore, is environmental regulation of resource-use characteristics, *within* these existing economic and political systems. Political ecology, in contrast, fundamentally challenges the dominant existing economic and political structures themselves as being the root causes of environmental problems. Changing political and economic systems and ideologies may be required to solve environmental problems according to this perspective.

The divergence of political from human ecology is particularly evident in the disasters field. Although not labeled as political ecology at the time, the works of structuralists Watts (1983) and Hewitt (1983a) criticized the works of behaviouralists Burton et al. (1978) and White (1974), for de-emphasizing the *processes* by which causality is rooted in social, political and economic contexts can be addressed (Watts, 1983). In this way, Watts (1983) attributes a different epistemological orientation to these earlier works in the human ecology field. Indeed, the work of Hewitt (1983a,b) is sometimes categorized as political ecology 'before its time' as it brought a critical element to descriptive human ecological traditions (Mustafa, 2002; McLaughlin and Dietz, 2008).

Oliver-Smith (2004: 10) contends that: "Vulnerability is inherently a political ecological concept".

This is because:

> … vulnerability is conceptually located at the intersection of nature and culture and demonstrates, often dramatically, the mutuality of each in the constitution of the other (see also Bankoff, 2001).

Disasters illuminate this complex mutual constituency among culture, society and nature. For instance, Adger and Brooks (2003) discuss the vulnerability of rural communities in the Sahel to climate change as largely a result of economic and agricultural development policies aimed at increasing national economic growth. Although the biophysical consequences of climate change are evident in increased drought conditions, 'top down' development approaches, "dictated by global economic paradigms" reduce the ability of rural communities to offset famine (Adger and Brooks, 2003: 29). Wisner et al. 's (2004) PAR model captures an inherently political ecological viewpoint, as does Bohle et al. 's (1994) model of famine. Political ecology explains vulnerability by capturing the relationship between societies and environments whilst not detracting focus from the wider political and economic structural forces that shape these relationships (Oliver-Smith, 2004).

2.4.2.3 Constructivism

Constructivists are concerned with the role of human agency and culture in interpretations of the world. Human agency is the capacity for human beings to make and exercise choices within their own cultural mileux. A constructivist perspective is 'post-structuralist' or 'post-modern', adding a consideration of human agency to structuralist perspectives (Wisner, 2004). In vulnerability research, a constructivist perspective focuses on cultural perspectives and the role these play in conceptualising who is 'vulnerable' and why. A brief consideration of the constructivist perspective is important here. Hegemonic social constructions of the 'climate change problem' – and vulnerability to it – shape the dominant discursive framework of adaptation (see Chapter Six)). There are clear parallels between political ecology and constructivism. Many political ecologists incorporate considerations of discourse and ideology into their frameworks of society-nature relationship (e.g. Escobar, 1999; Forsyth, 2003; Oliver-Smith, 2004).

Constructivists contend that everything is socially constructed or "enmeshed in discourses" (Longhurst, 2001: 5). Like political ecologists, constructivists are concerned with the mutual constitution of 'nature' and 'culture'. Unlike most political ecology, however, constructivists discard the notion that 'nature' or 'the environment' exists merely as an objective biophysical entity, but rather contend that it also always exists within culture. In other words, nature is, in itself, a culturally specific social formation that is brought into existence through available sets of meaning and discursive frameworks (Sundberg and Dempsey, 2009). These sets of meaning and discursive frameworks are called 'frames'. Frames provide "schemata of interpretation", allowing individuals to understand, explain, categorise and act upon occurrences in the world (McLaughlin and Dietz, 2008: 102).

In Western thought, nature and culture are considered dualistically. They are posited as binary entities where one (culture) is privileged over the other (nature). This is a Eurocentric view with roots in Judeo-Christian belief systems of human domination over, and exploitation of, nature (Oliver-Smith, 2004). Also central to the binary between nature and culture is 'science' and its notion of objective, universal and de-contextualised knowledge[15]. European colonial knowledge and power regimes have been central in universalizing this frame and it continues to expand (Sundberg and Dempsey, 2009). This dominant Western framing of the nature/culture divide shapes how environmental issues are perceived and responded to. However, not all cultures construct such a clear dichotomy between what is 'culture' and what is 'nature' (Escobar, 1999; Barnett and Campbell, 2010). Constructivism advocates a shift towards frame-relative thinking in this regard (McLaughlin and Dietz, 2008).

[15] This can be traced to the scientific revolution of the sixteenth and seventeenth centuries, in particular Descartes' framing of human reason as external to the biophysical body (Sundberg and Dempsey, 2009).

In the context of vulnerability, divergent frames produce varying definitions of vulnerability in terms of its character and causal structure. What causes vulnerability and disaster, and therefore what actions are needed to respond to these, is culturally constructed. McLaughlin and Dietz (2008) observe that frames form the basis for coordinating action on a problem and thus can represent struggles for domination in how the problem – and its solution – is perceived and acted upon. Thus, coordinated action, such as disaster risk reduction, is value-laden and can represent struggles for legitimacy and power among different actors. This is discussed at length by Heijmans (2009) who observes differing frames of meaning between locally-based and international-based CBDRR communities in the context of the Philippines; these opposing communities "… attach radically different meanings to the reasons why communities are unsafe and vulnerable, and believe therefore in different strategies and goals …" (Heijmans, 2009: 4). Heijmans contends that locally-based institutions derive their frames from cultural sets of meaning within local villages, which contrast considerably to the perceptions and understandings inherent at an international scale.

The social construction of vulnerability is debated. Radical constructivists suggest that disasters are entirely socially constructed. Radical constructivists – or 'anti-realists' – purport that there is no objective, external reality; only human representations of it. Radical constructivists therefore contend that there is no biophysical environment and therefore no independent environmental causality in vulnerability and disaster – only a perception of it (Oliver-Smith, 2004; Bankoff, 2004; McLaughlin and Dietz, 2008). Moderate social constructivists (such as Wisner et al., 2004; Wisner, 2004) reject an 'anti-realist' stance themselves – they conceptualise the biophysical environment as an independent causal force in vulnerability but accept that vulnerability is socially understood, represented and responded to (e.g. Bankoff, 2001). Moderate constructivists commit to the reality of an external world, but accept that the beliefs about that world are imperfect (Campbell, 1974, cited in McLaughlin and Dietz, 2008). This

is also called critical realism and is essentially the basis of a critical political ecology (Escobar, 1999; Forsyth, 2003). There is an objective reality (e.g. biophysical nature), but this is always a (re)constructed (e.g. beliefs about or understandings of nature).

Constructivists have made some important contributions to vulnerability research in the disasters field. They change understandings of vulnerability causality, adding emphasis to the cultural perspectives and values that shape agency, and whose cultural perspectives dominate. They emphasise the point that vulnerability cannot be understood out of specific context or 'place' and that it is historically contingent. Importantly, they question the discourse of disaster 'victims', demonstrating that people affected possess capacities and capabilities and use these to survive, recover and resolve their own problems. They critique the discursive notion that vulnerability researchers and practitioners are 'expert', invulnerable observers (Campbell, 2003; McLaughlin and Dietz, 2008; Barnett and Campbell, 2010). Finally, constructivists question the notion that hazards equal disorder; that hazards are an inconvenient interruption to the normal order of society originating from an unruly 'nature' (Oliver-Smith, 2004; Wisner, 2004). As discussed in Chapter Six, many cultures integrate 'hazards' into the regular workings of their society and do not perceive these to be outside the normal order of things; the word 'vulnerability' does not translate into many languages (O'Brien et al., 2004; Heijmanns, 2004; Barnett and Campbell, 2010).

2.5 CBA theory

By CBA 'theory', I refer to both conceptual underpinnings (such as social vulnerability) and 'best-practice' principals (such as empowerment and participation). Many proponents of CBA (mainly practitioners in NGOs and research institutes) assert that it has little theory: "it is not possible to learn the theory of CBA in a university or training workshop…the learning comes from the practice itself" (Huq and Reid, 2007: 2). An action-research approach is taken in CBA. As of yet, there is little in the 'academic' literature regarding CBA

specifically. The prevailing view of CBA advocates is that too much theorizing does little to increase rapid and effective action on CBA; theory tends to be too complicated, confusing and contradictory to offer any practical guidance to the largely non-academic organisations implementing CBA[16]. However, the need to "firm up" CBA – to give it a conceptual structure – is recognised. Refining the CBA concept has been a major focus of the four international CBA conferences held since 2005 (see Gutiérrez et al., 2007; Leopold et al., 2009; Kantai et al., 2010). These workshops aim to share lessons learned among practitioners working on CBA and are attended by international and national NGO's, United Nations groups, international development assistance organisations, national governments, and university groups. The emphasis on refining CBA has been largely in response to the increasing uptake of the CBA approach by major organisations, donors and funding bodies (e. g UNDP, GEF, FAO) which require a structure against which to establish good practice and measure outcomes (Ayers and Huq, 2009).

However, CBA has a more substantial body of theory behind it than commonly espoused. CBA is invariably based in a vulnerability-led approach to adaptation and engages (in discourse) with a starting-point interpretation of vulnerability. As CBA heavily draws on CBDRR, it engages much of the theory from the vulnerability paradigm in disasters research that underpins this approach. Thus, CBA draws from the theoretical traditions outlined throughout Sections 2.3.2 and 2.4 of this Chapter. Vulnerability-reduction forms the broad theoretical framework – however, it is how this framework is applied that distinguishes CBA from other approaches to adaptation.

Reid et al., (2009: 13) give a good definition of CBA:

[16] This is based on observations and discussions with stakeholders at the Third International Conference on Community-Based Adaptation. A large majority of participants were from practitioner backgrounds. I observed a distinct reluctance – and at times resistance – towards engaging in theory originating from academia.

> Community-based adaptation to climate change is a community-led process, based on communities' [sic] priorities, needs, knowledge, and capacities, which should empower people to plan for and cope with the impacts of climate change.

It is widely recognised in CBA that 'community' itself is a slippery concept. 'Community' indicates a cohesive unit with shared values, aspirations and goals. Communities are rarely this; priorities, needs, vulnerabilities, capacities, power and voices will differ between individuals and different intra-community groups (Wong, 2009). For the purpose of this thesis, "community" refers to a spatially bounded aggregation of interconnected social units such as households, that "interact directly, frequently and in multifaceted ways" (Bowles and Gintis, 2002: 420), and that have a shared identity of some kind. I recognise however, that 'community' includes a diverse range of individuals and households.

CBA is promoted as first and foremost an approach for 'the most vulnerable' – countries and communities within them that are critically vulnerable to climate change. That critically vulnerable communities are commonly those not reached by top-down adaptation efforts is the main impetus for the bottom-up CBA approach. CBA is advocated as an approach for communities who are marginalised, remote and unable to access sufficient services and support from governments (Huq, 2008; Reid et al., 2009). CBA processes commonly begin by identifying 'the most vulnerable' and poverty is invariably stressed as a key cause of this; "those likely to be affected are the world's poorest countries, especially poor and marginalised communities within these countries" (Reid et al., 2009). Thus, CBA is put forward as an approach for people already facing significant environmental problems, significant social problems or (most commonly), both[17].

[17] I argue in Chapter Six, that CBA can have a wider application as a proactive approach for communities who may not be experiencing self-identified significant vulnerability.

Table 5 Distinguishing conceptual features of CBA

Feature	Comments
No-regrets: building adaptive capacity and resilience	These terms are frequently used in CBA. Increasing adaptive capacity and resilience enables a greater degree of self-help at the local level, which is the focus of most CBA. Increasing the ability to cope with uncertainty is emphasized with increasing capacity to deal with current climate stresses often the focus. Lack of certain climate information is not a hindrance to action. Adaptation is 'no-regrets', having development and/or disaster risk reduction-related benefits for communities regardless of climate change impacts
Participatory	Adaptation is community-led. All CBA engages a participatory approach. CBA is invariably something that should be done 'with' rather than 'to' or 'for' communities. CBA strives to involve all groups in a community at all stages of a project: inception, assessment, design, implementation, and monitoring. CBA adheres to general best practice from participatory research and action approaches, however like all participatory approaches, participation occurs to varying degrees and takes many forms. The 'best' CBA strives to (eventually) put communities in the driving seat of the adaptation process, although ongoing partnership with an external institution is favorable.
Empowerment	CBA aims to 'help people to help themselves'. CBA processes strive to increase local voices and influence in decision-making about adaptation, feeding local insights and needs up into higher scale national and international policy and planning processes. This 'advocacy' element is fairly recent in CBA discourse. The goal is to increase the range of choices available to people and to increase the ability of people to make adaptive choices in their everyday lives rather than to have these choices imposed from outside. Education and capacity-building are therefore key components, as is providing wider enabling conditions. CBA activities are based on local priorities and goals, as articulated by local people themselves.
Culture and place-specific	Adaptation activities are based in local socio-cultural contexts and are in tune with local cultural values. Local cultural perspectives are the basis of project design because culture shapes values and goals – for example, local notions of well-being may differ from dominant international-scale indicators. CBA works with local decision-making structures and social dynamics. Adaptation activities occur *in situ.* Activities address specific problems based in specific local environmental, social, economic and political contexts. This means that much CBA to date is largely project-based. 'Scaling up' and replication is therefore a particular challenge and the focus of much current research
Local scale self	Obviously, CBA operates primarily at the scale of the community. The focus is engendering a high degree of self-reliance. Activities are

sufficiency	generally those that require low dependence on outside assistance or resource flows. However, it is recognised that local initiatives never operate independently from wider enabling conditions and power structures. Some CBA takes the stance of 'doing what is possible' at the local scale within the constraints of wider economic and political structures (see Smit and Wandel, 2006). Recently an 'emancipatory' tone is coming through in CBA discourse with a) an increasing focus on empowerment and b) recognition of the need for transformation of wider enabling conditions (Schipper, 2009).
Based in local knowledge: perceptions, priorities and capacities	CBA is based within local knowledge systems. In CBA, it is local people themselves who elaborate the causes and structures of vulnerability. It is their perspectives on their own 'vulnerability' that form the basis of assessments. CBA addresses local priorities and needs which are identified by the community itself. Ways to address these priorities and the resources needed are also identified primarily by the community. CBA builds upon existing local capacity and skills, recognising that local people often possess considerable capacity to cope with variable environments. Much CBA builds upon current and past practices for dealing with climate variability and extremes. In discourse, the 'best' CBA is often portrayed as combining local with scientific knowledge – particularly climate modelling information, if appropriate.
Table based on[18]: Allen, 2006; Gutiérrez et al., 2007; Huq and Reid, 2007; Jones and Rahman, 2007; Huq, 2008; Ayers and Huq, 2009; Ayers and Forsyth, 2009; Reid et al., 2009; Ensor and Berger, 2009; Leopold et al., 2009; Kantai et al., 2010; Dodman et al., 2010	

In recent discourse, CBA is espoused as more than merely adaptation that occurs at the community scale. CBA has become distinguished by more than scale, possessing the features outline in Table 5. The table lists the features of CBA which are commonly emphasised as distinguishing it from other approaches to vulnerability-led, local scale adaptation.

Although a CBA approach itself is relatively new, it draws heavily on experience from CBDRR (Allen, 2006; van Aalst, et al., 2008) and community development

18 In addition to cited literature, the contents of this table are based on discussions and deliberations with the 'terminology and concepts group' (Charles Erhart, Kathleen Dietrich, Anna Taylor, Rachel Berger, Christina Ruiz and Terry Cannon) at the Third International Conference on Community-Based Adaptation and on general observations made at this conference.

(Sabates-Wheeler et al., 2008). Distinguishing CBA from community development and disaster risk reduction is a major focus of current research in the CBA field[19]. CBA can be difficult to distinguish since activities to reduce vulnerability and empower marginalised communities are often no different from development and disaster risk reduction. Making CBA distinct is necessary to attract donor funding (Ayers and Huq, 2009). As such, CBA is often framed as an additional 'layer' onto CBDRR and community development initiatives (Huq and Reid, 2007; Jones and Rahman, 2007).

However, CBA is closely integrated with development, as many activities needed for 'adaptation' at the community scale coincide with those needed for sustainable development. Addressing the development problems that contribute to vulnerability in the first place – 'social vulnerability' – is something that has achieved limited success in top-down approaches to adaptation to date. CBA is frequently espoused as a 'silver bullet' solution to addressing starting-point, social vulnerability, effectively integrating adaptation with sustainable development (Ayers and Forsyth, 2009). Ayers and Forsyth (2009: 26) go as far as to say that: "community-based adaptation takes the approach of adaptation as development", which means that adaptation is synonymous with development. The local level is considered the most appropriate entry point to achieving this integration (Schipper, 2009; Dodman et al., 2010). I discuss this issue in more detail in Chapter Six.

In sum CBA is a new and evolving, yet distinct, set of principles and practices. Planned CBA is a community-driven process usually operating in partnership with an external institution. It addresses local vulnerability-reduction priorities, indicating embeddedness within local knowledge systems. At the core of CBA

[19] This is a major focus of the Global Initiative on Community-Based Adaptation (GICBA), a knowledge-sharing platform launched at the Third International Conference on CBA in Feburary, 2009.

'theory', CBA is concerned with human agency and culture in interpretations of vulnerability and, therefore, adaptation. Whether implicitly or explicitly, CBA – in 'theory' – is an attempt to break away from hegemonic discourses of climate change and vulnerability to it, in order to give voice to local groups and engender local solutions to self-identified problems; in other words, CBA is about empowerment and self-knowledge.

2.6 Summary

This chapter has established that CBA – in theory – is situated within a broad move towards reducing vulnerability as opposed to merely minimising climate change impacts in adaptation. In it, I have outlined the mainstream international adaptation discourse, showing the discursive progression from a focus on impacts to a focus on vulnerability. I have unpacked the concept of vulnerability and in particular, examined its theoretical roots in disaster risk reduction scholarship.

This discussion forms the basis for Chapter Six, where I examine the extent to which CBA theory is applied in practice in the Pacific context. 'Vulnerability' within the climate change adaptation realm has a particular conceptual framework that is sustained by a dominant discourse of adaptation as something that is distinct from development or disaster risk reduction. I argue in Chapter Six, that there is a substantial gap between vulnerability 'theorising' in the climate change field, and broader vulnerability theory from disaster, development and livelihood-related frameworks that pre-date it. This is reflected in the IPCC definition and approach which weds vulnerability primarily to the biophysical characteristics of climate variables and events rather than to longer term factors and processes that may have little to do with climate at all. Despite the broad shift towards vulnerability-led approaches in adaptation, I argue in Chapter Six that the conceptual framework of vulnerability prevalent in the climate change field perpetuates impacts reduction, not vulnerability reduction.

The next chapter considers some of the implications of applying the dominant conceptual framework of vulnerability in assessment.

CHAPTER 3

Methodology

3.1 Introduction

This chapter outlines the research methodology employed in this thesis. In particular, it discusses the methods I developed to enable me to address my second research objective: **To provide a platform for local voices by investigating local constructions of vulnerability in communities in Vanuatu.** Given this objective, it was imperative that I engaged a method of vulnerability assessment that enabled local constructs of vulnerability to climate stress to be represented as 'accurately' as possible.

The purpose of this chapter is twofold. One purpose is to describe, explain and justify the approaches taken to collecting, analysing and presenting the data contained in this thesis. Another purpose is to critically reflect upon how I have undertaken my research and in doing so, critically reflect upon established vulnerability assessment processes in CBA more broadly. I begin the chapter by introducing the field site of Mota Lava. I then outline the broad methodological approach, which is based on qualitative, critical geographies. I proceed to outlining the participatory ethic undergirding the design and conduct of the research. Given this participatory ethic, I next consider the ethics of my own position as a cultural outsider in the research, drawing upon debates in postcolonial geography. I then outline the problems encountered with existing participatory vulnerability assessment frameworks for CBA which prompted a shift in both research aim and methods. This leads onto a description of the methods employed in the case study of Mota Lava, presented in this thesis. Finally, I reflect upon participatory practice in my own research, noting the limitations and strengths of particular methods trialled along the way.

3.2 Mota Lava description

The island of Mota Lava is located in the northern Banks group within the Torba Province of Vanuatu (see Figure 7). Its location is approximately 450 kms from the capital of Port Vila on the island of Efate. The closest town is Luganville, on the island of Santo, which is approximately 230 kms away. The Torba Provincial government headquarters are located at Sola, on neighbouring Vanua Lava.

Mota Lava is a relatively high island comprised of volcanic peaks and limestone plateaus and coastal terraces (see Figures 8 and 9). It is approximately 12 kms from its north-eastern to south-eastern extremities and approximately 4.5 kms wide at its broadest point (see Figure 8). The island is surrounded by a fringing reef which extends around the islet of Ra, creating a lagoon.

The climate in the northern islands of Vanuatu is wet and tropical, experiencing an annual average rainfall of over 4000mm (Government of Vanuatu, 2007b). Seasonal variation in rainfall is fairly high with the dryer months occurring from June through September (Campbell, 1985). This dry period coincides with the cooler months. Tropical cyclones usually occur in the warmer months, November through April.

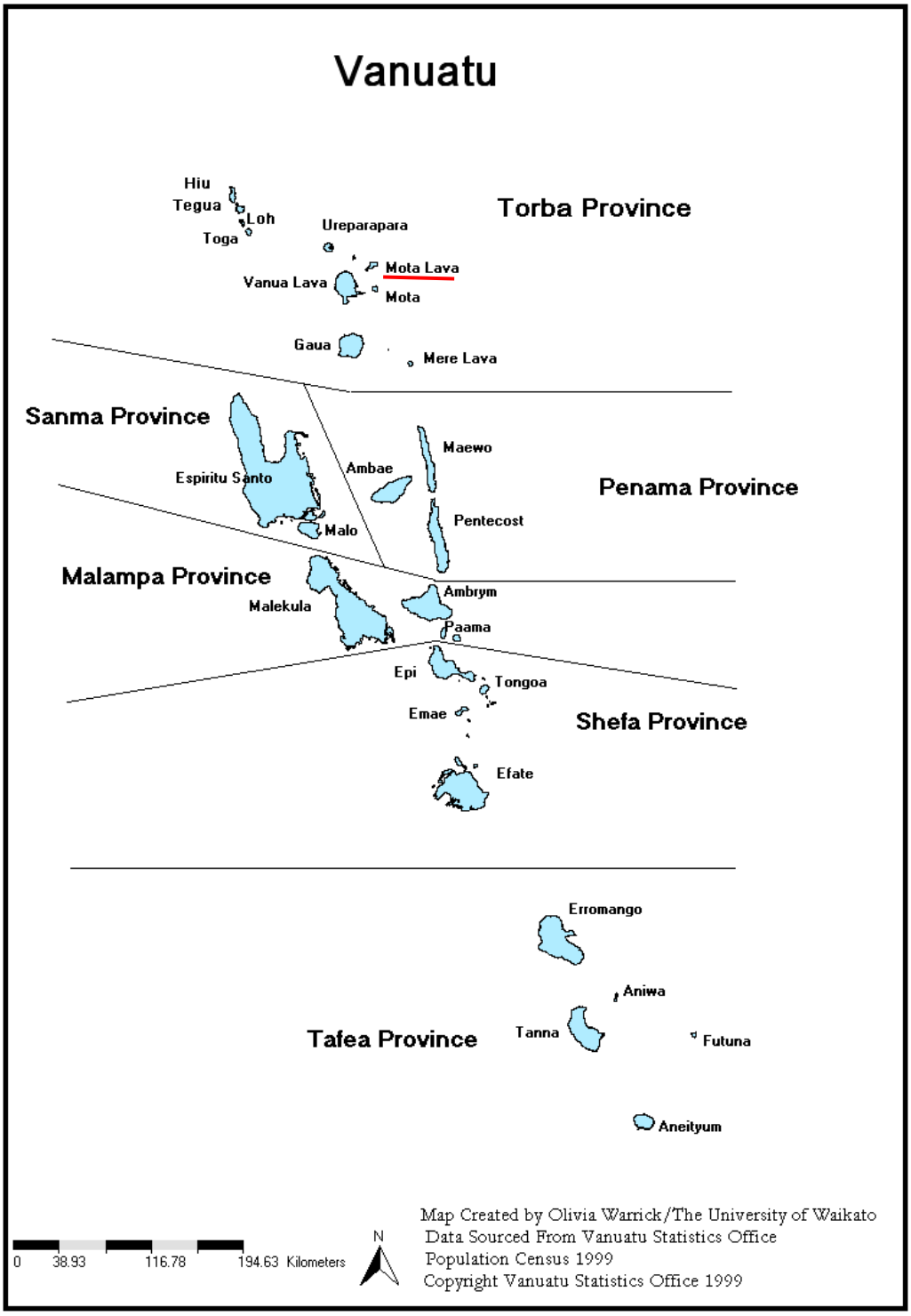

Figure 7 Map of Vanuatu showing Mota Lava's location in the Torba Province

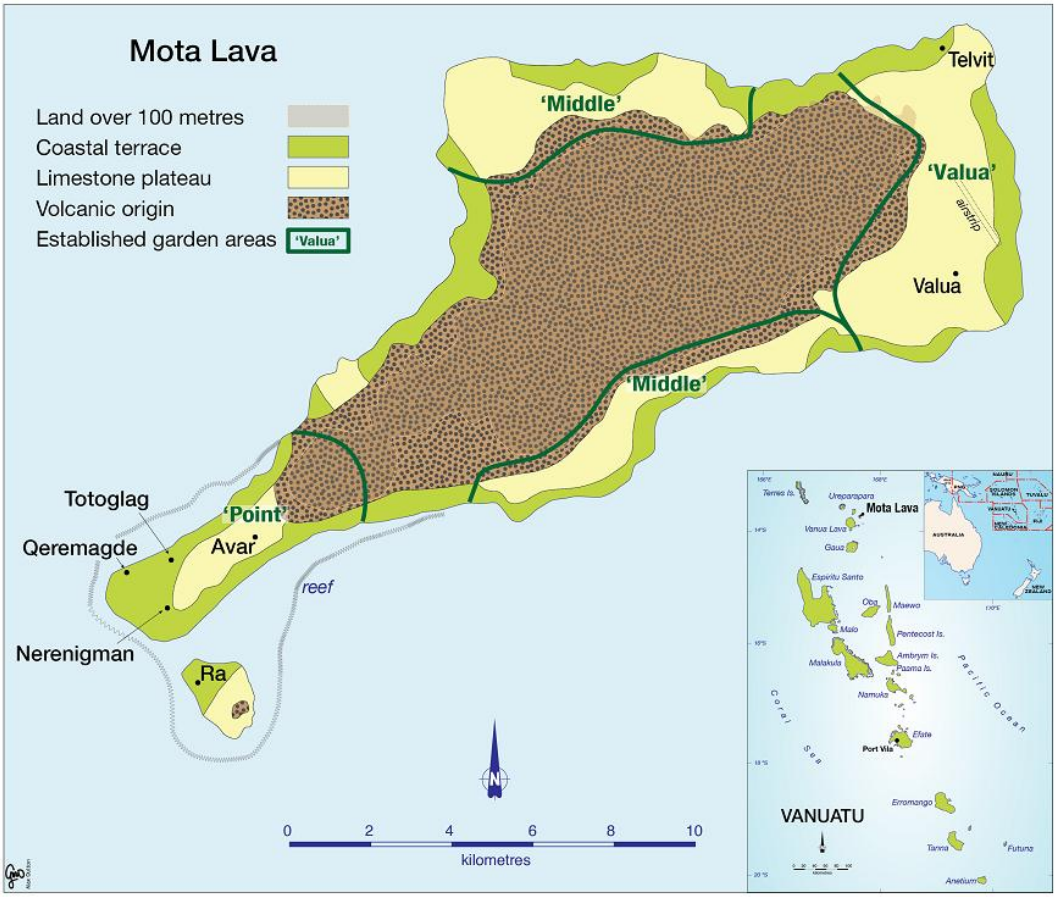

Figure 8 Map of Mota Lava showing the locations of villages and established garden areas

Figure 9 View of Mota Lava island, looking across the lagoon from Ra islet

Based on an informal census undertaken by the community in early 2008, the current population of Mota Lava is estimated at 1784 people. There are seven villages, the largest of which is Nerenigman (see Table 6) where I was based for the term of my fieldwork. The majority of the population live on the low lying peninsular at the south-western end in the closely proximate villages of Nerenigman, Qeremagde, Tologlag, Ra and Var (see Figure 8). This peninsula area is referred to as the 'point' by Mota Lavans. My research was undertaken with participants from all five villages at the point – I did not conduct extensive research in Telvet or Valua because of time restrictions.

Table 6 Village populations on Mota Lava

Village	**Total population**
Rah	212
Nerenigman	452
Qeremagde	298
Avar	254
Valua	146
Telvet/Demsas	126
Totoglag	296
TOTAL	**1784**

Each village on Mota Lava has its own governance structure, community groups, church groups and facilities. Residents can identify approximate boundaries around each village although these boundaries are not rigid. As the population grows and settlement expands, the villages are becoming more closely integrated. Although each village is distinct, residents operate together as a wider community and subsistence gardens are interspersed in the same land

areas. Although I refer to 'the Mota Lava community' in this thesis, this is for ease of reading. By the 'Mota Lava community', I am referring to people living in the five villages on the point. It is important to note that residents of these villages would not necessarily identify themselves as one community.

Semi-subsistence agriculture and fishing are the mainstays of Mota Lava's food security. Various fishing activities (Figure 10) provide dietary protein while gardens are the main source of carbohydrate and nutrients. Slash and burn agriculture is undertaken mainly for subsistence although provides some cash income for many households through local trade. Households usually maintain a number of gardens at any one time.

Figure 10 Fishing for mullet using nets at Rowa in the Reef Islands. Rowa is an important fishing ground for Mota Lavans

Subsistence gardens are of two major types, located within two different types of land use area. The bulk of crops for daily consumption and (limited) sale are grown in what I call 'established gardens' (Campbell, 1985, refers to these as 'yam gardens', however, because of a declining prevalence of yam in the gardening system, I refer to them as 'established'). Established gardens are

located on land that has been cultivated repeatedly by slash and burn for generations, traditionally being passed down through the maternal line. Crops are planted in successive stages, in orderly rows, on permanent plots demarcated by old breadfruit and coconut trees (although tree crops have a different system of inheritance to land crops) (see Figure 11). These established gardens are in three rough areas of the island referred to by Mota Lavans as 'point', 'middle' and 'Valua' (see Figure 8). Established gardening land at the point is the most intensively gardened, being closed to the locus of settlement.

Figure 11 a typical 'established garden'

The other major garden type is 'bush gardens' – crops planted in areas of denser primary or secondary bush. Bush gardens are mainly planted for 'back-up' or extra crops to supplement the main supply of crops from established gardens. Bush gardens have a much longer fallow period than established gardens and bush is not cleared to the same extent as established garden areas before crops are planted. Inheritance of bush garden land traditionally followed a different system, being passed through the biological paternal line, according to Codrington (1891). These gardens usually contain crops that require little regular

tending and less sunlight. Bush gardens are located throughout the island, normally at higher elevations to established gardens, on sloping land. In addition to these subsistence gardens, tracts of primary forest remain throughout the island that are (mostly) common property and utilized for hunting and gathering.

The majority of households on Mota Lava own coconut plantations that, in the past, provided the main source of cash income through copra processing and export. As discussed in Chapter Four, the copra industry has waned in recent years with reduced shipping services and although some copra is still exported, new plantations are not being established. Mota Lava is nonetheless integrated with the market economy and current income sources are examined in Chapter Four.

Mota Lava has three primary schools – two English speaking and one French speaking. Arep high school is located on nearby Vanua Lava. Mota Lava has one main medical clinic serviced by a government employed nurse. Each village has a number of community stores that provide basic imported food items. Goods are imported by ship and plane. An airstrip is located at the eastern end of the island, close to Valua village and is connected to the western end of the island by a single road. The island has one working truck and a number of motor boats. Each village has a number of rainwater tanks for capturing drinking water and a number of open and closed ground water wells for washing and cooking. There is at least one communal telephone in each village and at the time of my research Vanuatu's mobile phone networks were not operational in the Torba Province. The majority of dwelling houses are built from natural resources, using traditional methods (Figure 12).

Each village on Mota Lava is governed by a number (usually five or six) of democratically elected chiefs. Elections are held every two years. Chiefs range in age and are all male. There is also an island council of chiefs and an island 'paramount chief'.

Figure 12 Man constructing roof tiles from sago palm fronds

The island council of chiefs meets once a month to discuss community issues and resolve disputes. Mota Lava now has seven different Christian denominations although the Anglican church predominated until the late 1980s. Church leaders also play an important role in community governance. Each church usually has a women's group and a youth group for worship and community activities.

3.3 Research methodology: Qualitative, critical and participatory geography

Chapter Two established that CBA is (or should be) an inherently participatory process, fully engaging communities – and their knowledge – in all stages of effecting adaptive change. Methodologies in CBA, although diverse, are all underpinned by a participatory ethic and most engage participatory techniques drawn from community development and disaster risk reduction work (see articles in *Participatory Learning and Action*, 60). In line with the fundamental principles of CBA, my research methodology is embedded within a participatory approach.

Participatory research can be said to fall under the umbrella of qualitative, geographic inquiry informed by a critical social science paradigm, "which…seeks to empower the people in a setting and to work toward meaningful social change" (Bailey, 2007: 55). 'Critical geography' is generally used as an umbrella term to refer to approaches and movements in geography that recognise, question and transform, structures of power. Critically-inclined qualitative inquiry recognises that all knowledge production is political and entangled in power relationships, for example, between 'researcher' and 'researched' or between 'mainstream' and 'other'[20]. In particular, it is concerned with the way in which 'other' people and places are treated and represented in research, striving to avoid exploitation or oppression (Clifford and Valentine, 2003; Dowling, 2005; Kindon, 2005; Willis, 2007; Best, 2009; McEwan, 2009). Among others, critical geography encompasses feminist, Marxist, radical, activist, poststructuralist, and postcolonial geographies (Best, 2009). Given that this research is cross-cultural, it draws in particular upon the principals of postcolonial geography, broadly defined as that which seeks to correct the subjugation of 'others' knowledge and agency resulting from processes of (neo) colonialism by the West (Mohan, 2001; Hay, 2005; Howitt and Stevens, 2005; Howitt et al., 2009; McEwan, 2009)(see Section 3.3.2 below).

Winchester (2005) defines three main groups of qualitative research methods in geographic inquiry: oral, textual and participatory. Conversely, some authors place participatory research separately from qualitative research in terms of origins, philosophies and methods (e.g. Campbell, 2001; Mayoux, 2006). However, most acknowledge the common aims of participatory and critically-inclined qualitative research. Both are founded on the principals of: social justice, empowerment, emancipation, inclusion, self-determination, equality, collaboration and non-exploitation. Regardless of whether participatory research

[20] By 'other' I refer to groups or peoples perceived as different to the mainstream, against which the mainstream can establish their own identity (Hay, 2005).

is separate from, or a subset of, qualitative research, the two approaches are highly complementary and the methods developed in my research draw upon both. The methodology was designed to provide a platform for local, ni-Vanuatu voices regarding their priorities for reducing vulnerability to climate. Qualitative methods enabled participants' to express their own lived realities, experiences, values and opinions. Thus, instead of striving to unveil an 'objective social reality' as in positivist, quantitative research, participants' could construct their own social realities, based on their own locally grounded perspectives, knowledge and worldviews[21] (Clifford and Valentine, 2003; Bailey, 2007). At the same time, the participatory ethic underpinning the entire research process maximised empowerment, contributed to social change and shifted the power balance towards participants and their knowledge, as far as was possible within the bounds of a postgraduate research project.

3.3.1 Participation and participatory methods

Since the 1980's, participation has become an increasingly prominent principle in mainstream development thinking and practice. Participation can be broadly defined as the inclusion of local stakeholders in all stages of their own 'development' processes, from problem definition through to decision-making and action. This ideology arose in response to discontent with 'expert-led', blueprint approaches to development that largely excluded local concerns, knowledge and agency and therefore did not produce sustainable outcomes for communities in developing countries. 'Participatory research' emerged in concurrence with this movement in development ideology. Participatory research can be defined as a set of research approaches and methodologies that share the common attributes of: researcher-participant collaboration, emphasis on local/lay knowledges, learning and knowledge sharing, and an orientation towards social change (Cooke and Kothari, 2001; Kumar, 2002; Brietbart, 2003;

[21] For a self-critique of this statement, see Section 3.3.2 below.

Kemmis and McTaggart, 2003; Brockington and Sullivan, 2003; Hickey and Kothari, 2009). Participation and participatory research form the conceptual and methodological underpinnings of CBA, ostensibly in response to discontent with expert-led, blueprint adaptation practice.

Participatory research is research that benefits participants, not only through the outputs produced but also through the research process itself. Participatory research is distinguishable by a "value orientation of the work and its approach (epistemology) [rather] than the specific techniques used, although participatory techniques are certainly important" (Kindon, 2005: 208). The basic tenet of participatory research is that it is done 'with' and 'for' rather than 'on' people. 'Power' in participatory research is balanced towards the interests of participants and local stakeholders rather than external organisations. This general ethos distinguishes participatory research from other types of qualitative research although there is much cohesion with the ideologies of other critical geographies. Participation and postcolonialism are particularly mutually informative (Kindon et al., 2009). Participatory methodologies offer resources through which "critical social re-imaginations promoted by …. postcolonial scholars might be distanciated beyond the academy" (Kindon et al., 2009: 93). In other words, participation offers a framework thorough which equality of 'others' knowledge and agency in research might be achieved.

Although this general ethos underpins all research regarded as 'participatory', there are different forms and degrees of participation. Oakley et al. (1991, cited in Kumar, 2002) distinguish between "participatory development" and "participation-in-development". The former type constitutes local peoples' inclusion in activities and decisions that are ultimately defined by external actors. The latter consists of local peoples' empowerment and control over development processes. Similarly, a typology of participation in research can be distinguished (Figure 13) (sourced from Pretty et al., 1995; Kumar, 2002; Kindon et al., 2007). It is important to emphasise however, that different forms of

participation are appropriate in different research and project contexts. Absence of 'self-mobilisation', for instance, does not necessarily mean poor participatory research practice. Incorporating participatory principles wherever possible in the research process will considerably enhance benefits for participants (Kesby et al., 2005; Kindon et al., 2007).

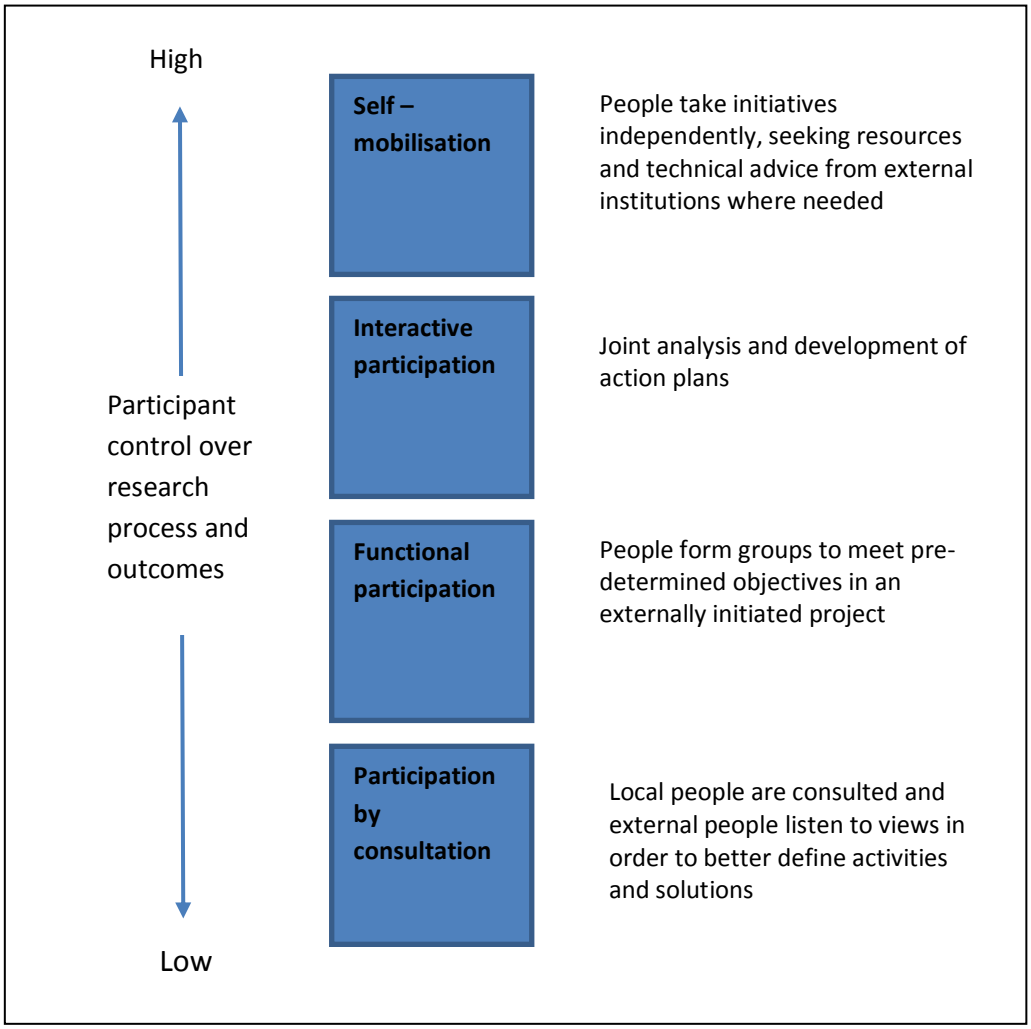

Figure 13 A typology of participation, based on Pretty et al. (1995) (cited in Reid et al., 2009)

Participatory research methodologies are often distinguished by the labels in Figure 14 (although there are many more labels than listed here (Kumar, 2002)). In this thesis, I use 'Participatory Learning and Action' (PLA) as an umbrella term

encompassing these various methodologies[22]. All are drawn upon in methodologies and toolkits for CBA (e.g. see articles in *Participatory Learning and Action*, *60*).

Although each approach has a somewhat different emphasis (also indicated in Figure 14), all are underpinned by a participant-focussed ethic. Although emphasis and intention varies among participatory methodologies, 'good-

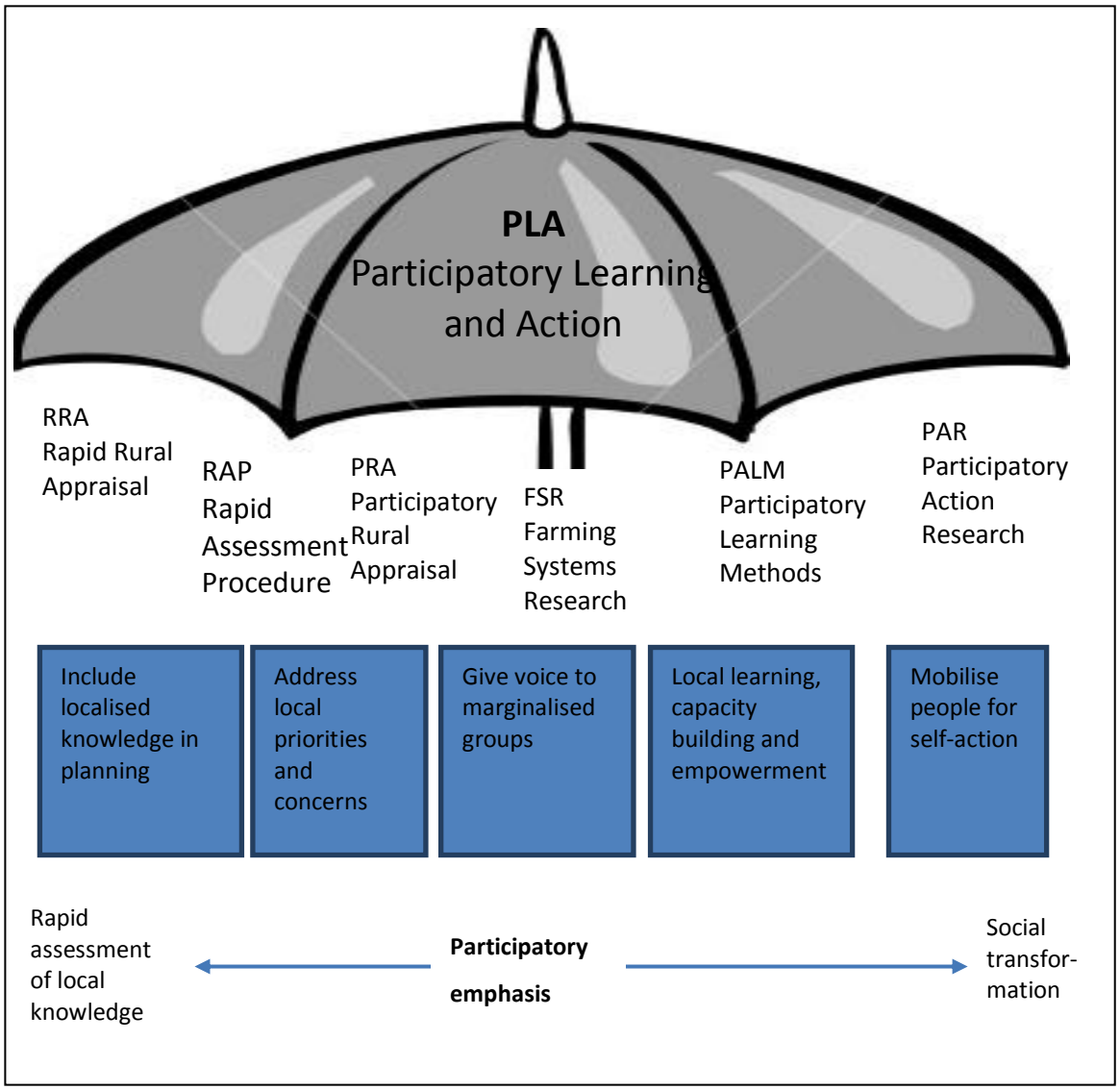

Figure 7 Common participatory research methodologies. The continuum indicates the emphasis and intention of participation, as roughly corresponding to each methodological approach (from Kumar, 2002)

[22] Although note than 'Participatory Action Research' is often used as the umbrella term instead (Kemmis and McTaggart, 2003; Kindon et al., 2007).

practice' participatory research has a number of features in common. Rather than being objects of study, participants ideally contribute to shaping all, or most of: research motivation, topic definition, methodological design, research implementation, knowledge creation and knowledge dissemination (Selener, 1998). Box 1 outlines an ideal 'code' of practical good-practice in participatory research.

A participatory ethic underpins my research methodology. I recognise, however, that the extent to which my research can be deemed fully participatory is questionable. The postgraduate research context poses particular constraints, not least that the primary purpose was research rather than community action. Some aspects of participatory best practice were achievable, while others were not. I do not claim that my research is fully participatory, only that it is infused with the principles of participation – in both topic definition and methods – wherever possible. This is examined throughout Section 3.6 below where I am transparent about my efforts to balance community learning and empowerment outcomes with research needs.

Stage 1: planning

- Establish sound and lasting community-researcher relationships
- Work through an organisation engaged in on-going work with communities
- Community defines the problem and shapes research topic
- Community shapes research methods
- Be open and honest about objectives and outcomes

Stage 2 implementation

- Ensure all groups in the community understand the research objectives, process and outcomes
- Ensure all groups have an opportunity to be involved (unless deemed locally inappropriate)
- Timing and pace should be governed by local context of separate sections of the community
- Recognise and target the different perspectives, knowledges and needs of different groups within a community (e.g. age, gender, class, religion)
- Incorporate voices that are often marginalised
- Control and use of information determined by the community
- Maximise learning and knowledge sharing through the research process
- Ensure flexibility and reflexivity

Stage 3 outputs and outcomes

- Research should result in distinct benefits for the community either through operational development change on-the-ground or through improvements at a higher institutional or policy scale
- Existing or new community institutions strengthened
- Ensure local ownership of information and research outputs
- Commitment to long-term, follow-up activities and support

Box 1 Good-practice in participatory research with communities (from Absalom et al., 1995 and Rambaldi et al., 2006)

3.3.2 Positionality, postcolonialism and cross-cultural research, or, should a *misis*[23] be doing this research?

The epistemological assumptions underpinning this research are derived from a postmodern or poststructuralist perspective. In other words, 'what is known' and 'what is real' is always culturally, socially and spatially relative. The research aims to generate a better understanding, recognition and representation of ni-Vanuatu ontological perspectives on climate vulnerability, in particular by providing a 'platform for local voices' in climate change adaptation knowledge. I, however, am not ni-Vanuatu. I am a *misis.* I grew up in Western countries (England and New Zealand), I am Western educated and my fieldwork was the first time I had lived for any significant period of time with a ni-Vanuatu or non-Western community in a developing country. Given this, is providing a 'platform for local voices' achievable? Moreover, is it ethical?

The answer I give for the first question posed above is: partially. What is investigated, found, represented, written and 'known' in qualitative research is a product of social interactions, relationships and interpretations (Dowling, 2005; Mansvelt and Berg, 2005). In providing a 'platform for local voices' therefore, it is not my intention to objectively and neutrally record 'facts' in the field (England, 1994). This would be oxymoronic with critical – and especially postcolonial – geographies which acknowledge that all knowledge is situated and is a product of researcher-participant intersubjectivity (Dowling, 2005; Bailey, 2007; Best, 2009; Sharp, 2009). Rather, the representation of ni-Vanuatu constructions of vulnerability to climate stress presented in this thesis is influenced by my position – my personal characteristics, background and social position – in the

[23] *'Misis'* is the *Bislama* term for a white, or Western woman. *'Masta'* is the male equivalent. These terms are left over from the colonial era and as noted by Hau'ofa (1993) reflect the social stratification along ethnic lines prevalent at the time.

research process (Dowling, 2005). My position as a cultural 'outsider'[24], and a Westerner in particular, shaped participants' responses and the way in which I interpreted them, based on my own culturally available frames of reference. In recognition of my positionality in the research, I write in the first person (Mansvelt and Berg, 2005).

Being aware of intersubjectivity and recognising positionality does not necessarily eliminate the power relations interleaved in the situations in which research occurs (England, 1994; Smith, 2003). Constantly reflecting upon the knowledge that is being produced in cross-cultural research is fundamental to avoiding inadvertent researcher misrepresentation (Skelton, 2009). Reflexivity is a pillar of critical qualitative inquiry and is the act of self-reflection upon one's self as a researcher, the role of one's own situated knowledge in the research process, and one's relationship with research participants (Clifford and Valentine, 2003; Hay, 2005; Kobayashi, 2009). Kobayashi (2009) contends that reflexivity is not only about considering how researcher positionality affects the production of knowledge, but is equally about asking who has the *right* to speak about or on behalf of, 'others'. This is particularly important to emphasise from the perspective of postcolonial research which aims to break down the colonial gaze[25] implicitly (or explicitly) underpinning much research with 'others'. In her oft-cited contribution to postcolonial analysis, Spivak (1988) asks: "Can the subaltern speak?" Spivak (1988) questions whether 'others' can express their own perspectives and knowledge, or whether these must always be 'translated' through Western cadences and concepts – the 'privileged view' – in order to be heard. As a *misis* researching in an 'after-colonial' situation, I can be said to hold

[24] By problematizing this term I am recognising that a cross-cultural researcher can be at the same time an 'insider' and 'outsider' or neither, depending on context and situation (Skelton, 2009).

[25] The colonial 'gaze' can be defined as "the practice through which the colonial power constructs the 'other' by envisioning the other in a subaltern position" (Kobayashi, 2009: 138).

the privileged view. It is impossible for me to fully ground my research in indigenous epistemologies and ontologies, as advocated by Gegeo (2001).

Thus, the second question posed above is a little more complex to answer than the first. Some scholars writing from the Pacific context such as Linda Tuhiwai Smith (1999; 2004) and Russell Bishop (2005), strongly advocate that indigenous research should be done by 'insiders' and that non-indigenous researchers have limited ability or right to engage in it. The reasons for this are clear:

> For Pacific peoples and other indigenous communities, research is embedded in our history as natives under the gaze of western science and colonialism … Pacific peoples are … use to being studied or 'helped' by outsiders who have become the academic authorities of and on the Pacific (Smith, 2004: 5).

I do not disagree with this viewpoint. Pacific research, by Pacific peoples, grounded in Pacific epistemologies is integral to self-determination. However, does this mean that, as a self-confessed *misis,* I have no right to have done the research that I have done? In this regard I agree with the conclusions reached by Skelton (2001: 91, cited in Smith, 2003: 190):

> As part of the politics of reflective and politically conscious … cross cultural research, we have to continue our research projects, we must publish and disseminate our research. If we do not, others without political anxieties and sensitivities about their fieldwork processes take the space.

While I can claim to be sensitive to ni-Vanuatu culture and ways of knowing the world, I, of course, cannot claim to have escaped my own cultural constructs of reality – these unavoidably influence the way I hear, and therefore represent, local voices in this cross-cultural research. For example, in my 'Western reality', nature and culture are separate – while I can recognise that ni-Vanuatu perceive nature and culture as less dichotomous, I cannot escape my own frame of

reference for this and this is reflected in the way I write Chapters Four and Five. Throughout the entire research process I constantly grappled with whether I was inadvertently perpetuating the 'colonial' way in which Pacific knowledges are often represented in climate change research. The proceeding sections outline the result of my own critical self-reflexivity in this regard, which, through a change in research direction and methods, minimised the colonial gaze in as far as was possible through maximising participation.

3.4 'False starts': the research progression

The data discussed in this thesis is primarily from one case study: the Mota Lava community. However, my fieldwork included two other case studies not discussed at length in this thesis. Prior to the Mota Lava case study (October-November, 2008), I facilitated research with: the Tangoa Island community, South Santo (June-July, 2006), and; the Mangaliliu/Lelepa Island community, Northwest Efate (June-July, 2008). I discuss only the Mota Lava case study in this thesis, for the following reasons[26].

The research methodology employed in the final case study of Mota Lava was considerably different from that employed in the earlier case studies. There are two primary reasons for this. Firstly, I changed the methods used in order to maximise participant benefits, as far as was possible within the context of PhD research. This is discussed in Section 3.6 below. Secondly, I changed the approach and methods to enable a more 'accurate' representation of local knowledge and priorities to be reflected.

In earlier fieldwork I primarily employed methods from established vulnerability assessment frameworks for CBA (see following section). However, I found that there were distinct tensions between the conceptual structure of these

[26] This does not mean the data from Tangoa and Mangaliliu/Lelepa is redundant. Insights from the additional two case studies will be presented in papers, following the completion of the thesis.

frameworks and the ways in which local people constructed their own vulnerability to climate. Although the shortcomings initially seemed merely 'method-related', I eventually realised that the problem lay within the conceptual framework upon which the established assessment methods were based – a conceptual framework sustained by the mainstream international adaptation discourse or 'worldview'. It was only after spending considerable time living with ni-Vanuatu communities that I was able to form a sufficient understanding of local worldviews to recognise these tensions.

Forsyth (1996: 389) states:

> The power balance of environmental research has moved towards the communities but not their knowledge.

I reached a similar conclusion towards the end of my second field visit, prompting a shift in the overall aim of the research[27]. When it began in 2006, my research had a different aim. It began with the aim to assess vulnerability in three case study communities in Vanuatu and, from this, identify appropriate adaptation options. The purpose was to address the lack of community-based vulnerability assessments in the Pacific (and Vanuatu especially) that could be scaled-up in order to inform national adaptation planning and implementation. Although focussed upon including local concerns in adaptation decision-making, this approach took for granted the suitability of the mainstream international adaptation discourse – and its conceptual framework of vulnerability – in allowing local concerns to be adequately represented. My experiences in applying established assessment frameworks in the ni-Vanuatu community

[27] I recognise that the topic of climate change poses a fairly unique challenge in this regard, since the scientific knowledge is largely held by community 'outsiders' and therefore is (arguably) in a sense unavoidably top-down. However, as is argued at length in Chapter Six it is an over-fixation on the science in climate change discourse – 'nature' as the major threat – (Gaillard, 2010; Demeritt, 2006) rather than on vulnerability that excludes adequate treatment of local knowledge in assessment for CBA.

context, highlighted that the suitability of the mainstream discourse should not be taken for granted. As adaptation initiatives are the outcome of vulnerability assessment, community-based adaptation needs and priorities could potentially not be adequately met. I decided that there was a more important question to be asking: **to what extent does the mainstream international adaptation discourse enable effective community-based adaptation in Pacific island countries?** This shifted the focus of the research towards examining local, indigenous frames of thinking about climate-related problems.

Because of the shift in research aim and methods, the Mota Lava case study focuses on elucidating local voices in depth. I decided to dedicate the space in this thesis to presenting this depth and detail – depth and detail that is lacking in Pacific adaptation research to date.

3.4.1 Initial assessment framework

The methods employed in earlier fieldwork were based upon the 'Community Vulnerability and Adaptation Assessment and Action' (CV&A) guidelines developed by the Secretariat of the Pacific Regional Environment Programme (SPREP). These guidelines were developed for community vulnerability and adaptation assessment work as part of the CBDAMPIC project. The CV&A guidelines outline a:

> Collection of activities that provide a learning process to empower local communities to identify, analyse, and develop ways and means of increasing their local adaptive capacity to current and future challenges and opportunities related to climate change (Nakalevu, 2006: 11).

The guidelines engage the principles of participation, drawing in particular from Rapid Rural Appraisal (RRA), PLA and Comprehensive Hazard and Risk Management (CHARM[28]) (Nakalevu, 2006).

This particular methodology was selected because it was, at the time, one of the few established and documented methodologies for assessment for CBA. It had been tested and implemented as part of a successful CBA project in Vanuatu (Phillips, pers. comm., 20.01.2006). Since my initial research purpose was to expand and build upon existing community vulnerability knowledge in Vanuatu, it made sense to use the same assessment framework. Although the CV&A framework provided the initial guiding structure, specific tools and techniques were also drawn from other guided participatory toolkits for CBA and community-scale disaster risk reduction, in particular: the 'Climate Witness Community Toolkit' developed by the World Wildlife Fund for Nature South Pacific Programme (McFadzien et al., 2005), the Red Cross/Red Crescent 'Vulnerability and Capacity Assessment Toolbox' (IFRC/RC, 2007), and the 'Guidelines for Community Vulnerability Analysis' developed by UNDP (Vrolikjs, 1998).

The CV&A methodology aims to identify and characterise climate-related vulnerabilities, coping mechanisms and adaptation priorities. The conceptual framework underpinning the community assessment process is shown in Figure 15.

[28] CHARM is a disaster risk reduction programme situated in the Pacific Islands Applied Geoscience Commission (SOPAC), the Pacific regional home for disaster risk management.

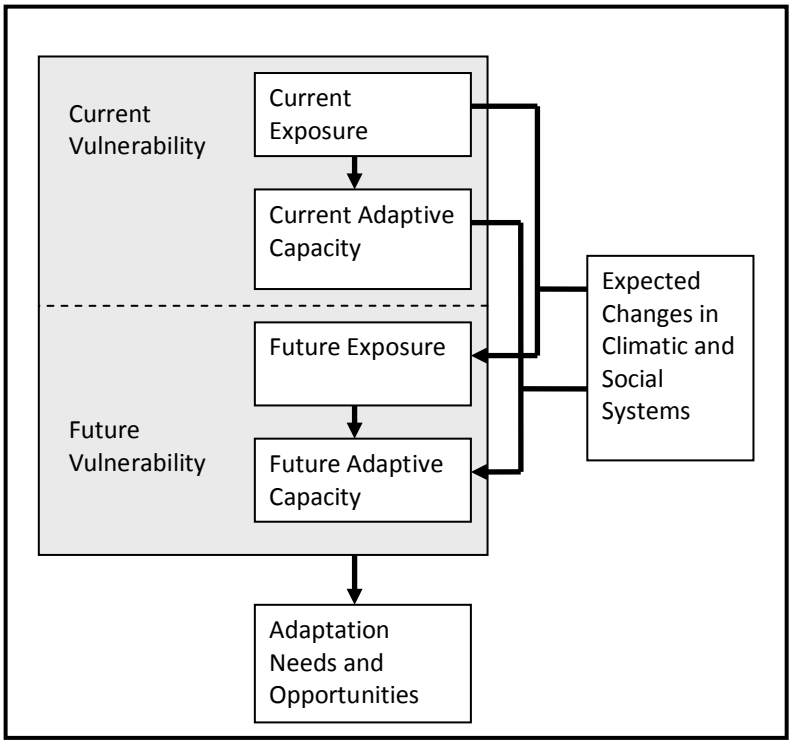

Figure 8 Components of the CV&A process. From Nakalevu, 2006:19; Smit and Wandel, 2006:228; Sutherland et al., 2005:12; Ford and Smit, 2005:13; Nakalevu et al., 2006:17.

The framework shown in Figure 15 provides the basis for a number of research questions. The core themes of the research questions are provided in Box 2. In accordance, these themes formed the basis of research questions structuring my initial fieldwork. A (flexible) range of participatory, mainly group-focussed, techniques are employed to provide the answers to these questions. Box 3 outlines participatory tools commonly employed in assessment for CBA. The specific participatory tools trialled and used throughout my own fieldwork are identified and discussed in Table 10 below.

CV&A research question themes

- Problematic climate or weather
- Impacts of climate-related events or conditions
- Different socio-economic groups affected
- Community sectors and locations affected
- Current methods of coping with impacts
- Implications if problematic climate events/conditions worsened
- Changes in climate or weather conditions
- Effects of changes in climate/weather

Box 2 Core themes of research questions in the CV&A methodology (from Nakalevu, 2006)

Participatory tools

- Historical timeline
- Impact and frequency ranking matrix
- Transect walk
- Seasonal calendar
- Community and resource mapping
- Focus group discussion
- Stakeholder analysis of socio-economic groups
- Institutional analysis
- Cause and effect trees
- Semi structured interview

Box 3 Participatory tools commonly employed in assessment for CBA (from Nakalevu, 2006 and McFadzien et al., 2005)

3.4.2 What was wrong with the initial assessment framework? Decolonizing the methodology

I found that the conceptual framework underpinning my initial research (Figure 15 above) – and the research questions and participatory techniques engaged as a result – was too prescriptive and restrictive to enable an 'accurate' representation of local voices regarding vulnerability to climate. A key principal of postcolonial and participatory research is promoting legitimacy of local or 'others' approaches to knowing and enabling their priorities, needs and concerns to be voiced and heard. In their discussion of postcolonial research however, Howitt and Stevens (2005: 43) caution that:

> Participation itself does not, of course, necessarily represent a break from colonial research since it can amount to nothing more than enlisting local cooperation in a research project that continues to be driven by outside researchers' definitions …

Critics of participatory approaches have concerns that 'participatory' terminology and techniques are increasingly being adopted in 'research as usual' – research that remains 'top-down' and Eurocentric (Cooke and Kothari, 2001; Kindon et al., 2009). Although it may be well intentioned, participation can act to entrench prevailing power relationships between 'expert' and 'other' and between the respective legitimacy of 'Western' and 'non-Western' knowledges (Mohan, 2001). The *way* in which 'local knowledge[29]' is treated and generated in research is perhaps more fundamental to participation than merely the inclusion of it. Mosse (2001) describes how the production of 'local knowledge' and identification of 'local needs' are frequently structured by the pre-defined agendas of intervening agencies. Similarly, I found that my initial methodology was subjugating local knowledge by predetermining the ways in which local voices were 'heard' in assessment.

I found that local ni-Vanuatu constructs of vulnerability to climate stress were far broader, deeper and more culturally nuanced than the initial conceptual framework (Figure 15) allowed. Similar problems are identified by Allen (2003) in the context of CBDRM. Allen (2003) found that vulnerability frameworks defined by community 'outsiders' in CBDRM project settings seldom accommodate local conceptual understandings of vulnerability. She cautions that

[29] By local knowledge I refer to culturally specific worldviews and values as well as particular knowledge and practices. This is commonly referred to as indigenous, traditional, or traditional-ecological knowledge (Berkes, 2008; Gorjestani, 2000; Berkes et al., 2000; Agrawal, 1995).

> Isolating vulnerability to events from other manifestations of vulnerability predefines 'problems' and risks bypassing local priorities and realities (Allen, 2003: 182).

I reached a similar conclusion in my own research. In response, I re-orientated my research methodology to better accommodate local, ni-Vanuatu 'ways of knowing' about climate stress.

Chapter Six discusses in detail, the way in which local people construct their own vulnerability to climate stress (elucidated in the final case study of Mota Lava). In short, I found that local people constructed their own 'vulnerability'[30] as arising from social issues embedded in a wider development context. In contrast, the conceptual framework outlined in Figure 15 remains focussed on physical climate stressors as the primary drivers of vulnerability in the context of climate change. This focus perpetuates a rather rigid construction of climate change vulnerability as something caused primarily by exposure to specific physical, 'natural', external climate stimuli and their biophysical impacts. Vulnerability to climate is therefore constructed as a phenomenon largely separate from social, cultural and development processes[31].

This construction is reflected in the research questions stemming from the framework (Box 2) – all are focussed on specific 'external' events or conditions caused by 'the environment', their direct effects and how they are directly responded to. Although these questions were indeed relevant to participants in my research, through their eyes this was a rather superficial analysis of climate

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[30] Although 'vulnerability' is not self-identified and there is no direct translation of this concept in *Bislama*, or in the local vernacular of Tangoa, Mangaliliu/Lelepa or Mota Lava.

[31] This issue is revisited in depth in Chapter Six, Section 6.3 where I examine: the theory of vulnerability in the climate change field; it's disconnect from vulnerability theorising in other fields, and; the mainstream social construction of vulnerability and adaptation as a 'science problem' rather than a problem of development and inequality.

problems. Local people prioritised the *root causes* of climate-related vulnerability – causes that more often than not had nothing to do with climate and everything to do with socio-economic change, development and inequality. I found that the focus on physical climate stresses as the driver of vulnerability, risked bypassing valuable traditional knowledge about vulnerability reduction. A great deal of the ability to deal with cyclones, for example, arises from cultural, social and agricultural practices embedded in the processes of everyday life. These practices are not necessarily consciously undertaken to reduce vulnerability to cyclones per se, but often form the foundation of resilience. When research is focussed on specific climate stresses and their impacts, knowledge and strategies for coping and adaptation may be restricted to those which are directly or obviously linked to specific climate stresses. The conceptual framework outlined in Figure 15 enabled an analysis of the *proximate* causes of vulnerability to climate only, being based on a different ontological understanding of the relationships between climate and society.

Barnett and Campbell (2010) call for a decolonisation of climate impacts research in the Pacific region in recognition of the fact that most knowledge regarding climate change is not produced by Pacific islanders themselves. My research experience indicates that 'decolonising' climate change research in the Pacific requires more than a 'participatory' approach operating *within* dominant 'scientific', 'Western' or mainstream conceptual frameworks and worldviews (see also Forsyth, 1996; Mosse, 2001; Berkes, 2008; Bravo, 2009). Rather, it requires research to be led by the "knowledge, needs, rights and values of the people who will be exposed to climate change, and who will have to adapt to it" (Barnett and Campbell, 2010: 83). In my initial fieldwork I found my approach to be 'participatory' only as far as local voices fitted into the pre-defined research questions dictated by the predefined conceptual framework (see also Allen, 2003). There was little scope for local people to express and formulate their own constructions of climate problems. As such I re-orientated my research, developing the *storian* methodology (elaborated in Section 3.5.2), focussing on

in-depth discussion through personal relationships and participant-researcher rapport.

I do not wish to be overly critical of the CV&A methodology. I recognise that the CV&A guidelines are intended primarily for use in a project context and that my research was not operating as part of a wider project. In a project context, project activities and outcomes will always be shaped, to a degree, by the remit of funders and/or implementing organisations. It therefore makes sense to design a methodology fitting into this remit, making it as 'participatory' as possible. It would make little sense to guide a participatory process producing local priorities that cannot be funded or implemented. The CV&A methodology should be commended for shifting the power balance of climate change research towards communities, if not (entirely) accommodating their knowledge.

3.5 Research methods in the Mota Lava case study

In this section, I outline the 'mechanics' of my research on the island of Mota Lava. I introduce the methods and techniques used for data collection and analysis, the ethical procedures followed and the participants involved. The methods outlined in this section are the outcome of the 're-orientation' of my research discussed above. When fieldwork began on Tangoa Island, I was using mainly group-orientated participatory techniques to address the research themes outlined in Box 2. In the final case study of Mota Lava, I was using predominantly interviewing and participant observation techniques to examine both general community issues and concerns and their relationship to climate-related problems. This 'two-pronged' approach enabled participants to express their own constructions of climate related vulnerability. The approach is depicted in Figure 16.

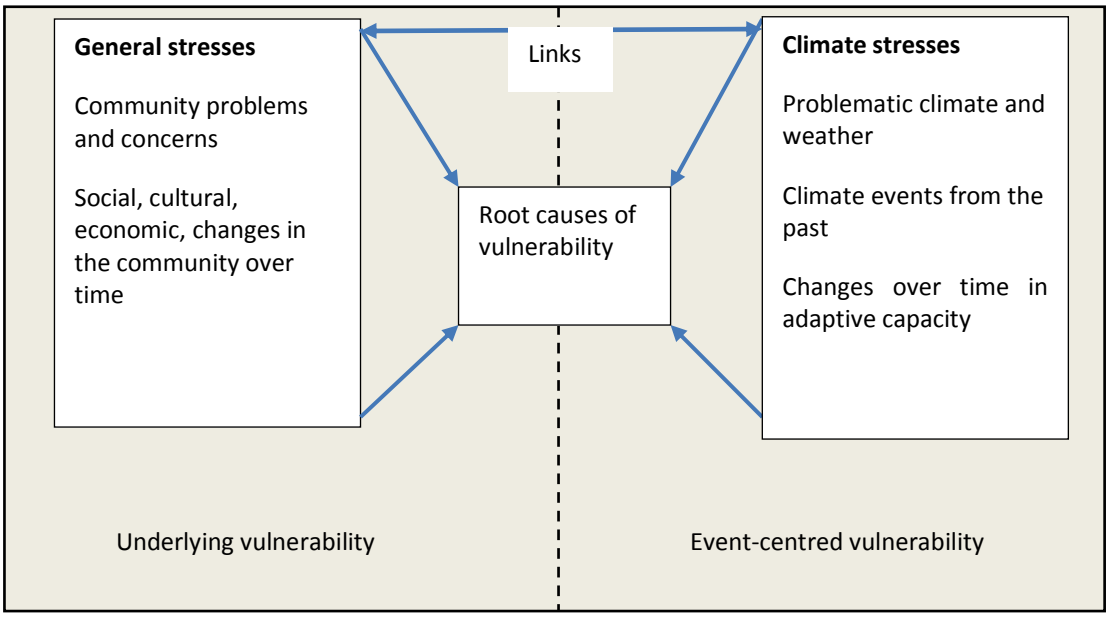

Figure 16 The 'two-pronged' research approach

This 'two-pronged' approach allowed participants to emphasise, and voice in their own way, the socially orientated root causes of climate problems, making the research less prescriptive. *Storian* – and indeed the entire research process itself – generally flowed in one of two directions: from discussion of 'non-climate' stresses towards linking these with climate-related problems, or vice-versa (see Figure 16). This was particularly effective, given the particular climatic situation of the communities I visited as it better facilitated a true representation of the relative perceived priority of climate stress. Rather than beginning with explicit questioning regarding climate stress and related problems which may paint a somewhat skewed picture of relative concerns, participants were able to relay in their own way the 'multiple stressors' influencing vulnerable situations.

3.5.1 Community case study

This research employs an intensive case study approach. A case study can provide a 'thick description' or analysis of a community's own issues, contexts and interpretations (Stake, 2005). This research is interested in what can be learned from a particular case (Stake, 2005) – the Mota Lava community's

constructions of vulnerability to climate. Because of the need to 'get close' to participants in order to understand their context-bound perspectives, I chose an intensive case study approach rather than a comparison of multiple case studies (Gerring, 2007). It is not my intention to generalise the findings from this particular case study, but rather to use the findings to address and contribute to larger questions and issues in climate change adaptation and human geography (Hardwick, 2009)

Community-based fieldwork was undertaken on Mota Lava continuously over a two-month period in October and November, 2008. I spent the majority of this time living with the community, with a five day period conducting interviews at the Torba provincial headquarters on neighbouring Vanua Lava. A significant period of time in the community was necessary to ensure understanding and acceptance of the research and to enhance learning outcomes. In addition, I spent many weeks living in both Port Vila and Luganville between 2006 and 2008, during which interviews were conducted with key informants based in these towns. A wide range of secondary data sources were also consulted including: statistics, government reports, NGO reports, academic literature and research reports.

Vanuatu was selected as a case study country for this research because of initial contacts in-country. An established relationship with 'gatekeepers' at both the national and community level is essential to obtaining research legitimacy (Leslie and Storey, 2003). This thesis began as a Master's thesis at Victoria University of Wellington in 2006. At this time, collaborative research between the School of Earth Sciences and the Tangoa Island community was in its early stages. It was through these existing relationships that I was able to gain access to my initial field site (Tangoa Island) and was invited by the community to conduct research there in 2006. I subsequently built relationships and made contacts in Vanuatu that enabled my research to continue and expand to other sites. The reasons for choosing Mota Lava – a remote and expensive location to reach – as a

community case study are outlined in Section 3.6.1 below. Importantly, I was able to establish contact with a gatekeeper on Mota Lava who became my local research counterpart. In addition, research had been undertaken in the field of disasters (Campbell, 1985) and development (Tapari, 1993) on Mota Lava previously, which provided a good source of secondary data to inform my fieldwork.

3.5.2 Data collection: *'storian'*

I call the group of research methods employed in the Mota Lava case study '*storian'*. *Storian* is a *Bislama* term meaning to "chat, yarn, swap stories" (Crowley, 1995: 235). I use *storian* as an umbrella term indicating semi-structured interviews, open interviews and opportunistic discussion as part of participant observation, with community members. Irrespective of specific method, the central feature of *storian* was building rapport with participants. *Storian* is essentially a Vanuatu-specific form of 'Talanoa': an established, culturally appropriate Pacific research methodology referring to "a personal encounter where people story their issues, their realities and aspirations" (Vaioleti, 1999-2003 cited in Vaioleti, 2006: 21). The strengths of *storian* compared to group-orientated methods are outlined in Section 3.6 below. As the name implies, much *storian* consisted of literally telling stories – for instance about significant cyclones that had occurred in the past. Additionally, key informant interviews were conducted with members of governmental and non-governmental organisations in Vanuatu.

This combination of methods enabled flexibility – some methods were better suited to certain groups or individuals in the community than others. The combination of methods enabled triangulation of findings, which is essential to the robustness of data and validity in qualitative research (Davidson and Tolich, 2001; Patton, 2002).

Figure 17 Storian with younger participants during a fishing trip to Rowa

3.5.2.1 Community interviews

Interviews were both semi-structured and unstructured. By interview I refer to a more formalised *storian* context, where either: the discussion had been requested (by either myself or the participant) and organised beforehand, or; the discussion was opportunistic, but lengthy, in-depth and concentrated. Interviews were recorded on a digital dictaphone or by hand-written notes, depending on appropriateness. A field diary entry was written following each interview, including personal reflections on participant attitude, interview context, people present, questions asked and points to follow up.

The advantage of a semi-structured format was that I was able to focus and direct discussion around specific content relating directly to the research objective (see Appendix Five for semi-structured interview themes). The disadvantage however, was that my role was fairly 'interventionist' and there was therefore less room for new topics of inquiry to be revealed (Kitchin and Tate, 2000; Dunn, 2005). Unstructured interviews allowed more room for participants to express their personal perceptions and histories (Kitchin and Tate,

2000; Dunn, 2005). Personal accounts of significant climate events were a particularly effective way of drawing out the factors shaping vulnerability (e.g. see Box 4 below). Unstructured interviews were participant-led – questions asked were determined by participant responses. Importantly, unstructured interviews can allow perspectives to come to the fore that may be concealed by the dominant view (Dunn, 2005).

Interviews were carried out either with individuals or small groups of two to four people. Patton (2002) points out the advantages of unstructured group interviews in fieldwork (rather than 'focus groups') – often participants feel more comfortable when together than in an intensive one-on-one interview situation. Commonly, family and friends would come and go, contributing intermittently throughout the interview. Most individual and group interviews lasted for one to three hours which reflected the context of *storian* – a relaxed and enjoyable exchange among friends. Most frequently the interview would occur in the participant's home, although it was common for an interview to be combined with an activity such as going to the garden so, at participants' suggestion, I could 'learn by doing'.

The intention was for the interviews to remain conversational – a format with which participants were most comfortable. Interviews enabled participants to emphasise the topics that they felt were important. The flexible nature of interviews meant that I could explore topics about which each participant was particularly knowledgeable. For example, some participants had specific knowledge about traditional weather forecasting techniques, while others were knowledgeable about food preservation. Often, a participant's specific area of knowledge acted as a starting point for the conversation and discussion would branch out from there. Both semi-structured and open interviews allowed for unexpected topics and issues to come to the fore and be explored in more depth. With a few exceptions, I interviewed participants multiple times to follow up on points that were unclear or required more discussion.

A disadvantage of semi-structured and open interviews is that questions and responses are not standardised and directly comparable. This makes analysis more difficult as responses can be lengthy and convoluted (Patton, 2002; Overton and van Diermen, 2003). Indeed, the conversational, open and relaxed tone of the interviews meant that discussion frequently strayed off topic and I faced many weeks of transcription and complex analysis. However, the conversational tone was a key feature of the rapport around which *storian* is based. For the purposes of this research, it was more important to give participants the freedom to express things in their own way, than to ensure a standard frame for comparison and analysis (Overton and van Diermen, 2003). When interviews strayed far from the topic, I would simply pause the recording or note taking. That I was relatively non time constrained was advantageous in this regard.

3.5.2.2 Participant observation

Interviewing was conducted concurrently with participant observation. Participant observation is a field strategy which involves:

> … researchers moving between *participating in* a community … by deliberately immersing themselves in its everyday rhythms and routines, developing relationships with people who can show and tell them what is 'going on' … and *observing* a community – by sitting back and watching activities which unfold in front of their eyes … (Cook, 1997: 167) (Emphasis on original).

I participated in community life in as much as was possible within the bounds of my fieldwork term. Given the aim (to provide a platform for local voices), participatory ethic, and cross-cultural nature of this research, it was necessary to spend a significant period of time immersed in community life. Developing personal relationships with people is an important aspect of participant observation (Patton, 2002). During my fieldwork I lived in the homes of local families, participated in regular household routines and chores and participated

in community activities. For example, on a day to day basis I participated in activities such as gardening, washing, cooking, fishing and attending church[32] . At the time of my fieldwork (October and November) daytime temperatures are very high in Northern Vanuatu. Livelihood activities are undertaken in the early morning and early evening. During the heat of the day, many families take mats and food to the coast and *spel* (rest), *storian* and play cards in the *fres win* (cool breeze) blowing off the sea. This provided an excellent opportunity for *storian* with a broad range of participants. Through this I formed relationships and increased my sensitivity towards participants' 'life worlds'. I also participated in community events and activities, including chief and leaders meetings and workshops which provided a valuable opportunity for observation of issues in the community and how they are dealt with.

Patton (2002) contends that in participant observation there is little distinction between 'interviewing' and 'observation' because the researcher is fully engaged in experiencing the situation. Informal, opportunistic discussions undertaken whilst participating in normal, everyday community life formed an integrally important part of my data, alongside more formalised interviews. These discussions enabled a closer contextual understanding of the way in which local people 'see things' than more formalised interviews. Data was recorded via field notes, when appropriate. Often, taking notes was not appropriate however, as this would have disrupted the 'normality' of my participation in a situation (see also Cook, 1997; Kearns, 2005). I kept a detailed and structured field diary where I recorded contexts of participation, recollection of discussions, observations,

[32] As a non-religious person, this raised important ethical questions for me as I did not want to deceive people or become too engaged in church-related activities. Since Mota Lava has seven different denominations, I wanted to avoid becoming too closely associated with the (dominant) Anglican Church. The family I lived with were highly religious. Not attending church would have impacted their acceptance of me. As a mark of respect for the family, I accompanied them to church, however, I did not engage in communion or lead prayer, explaining that it was not part of 'my culture' back home.

ideas and reflections upon my (mis)interpretation of situations (Cook, 1997; Kearns, 2005; Dowling, 2005)

A possible limitation in the context of my fieldwork aim (to provide a platform for local voices) is that the fieldwork term was not long enough for me to gain an in-depth enough understanding of the socio-cultural context[33]. The fieldwork term was shorter than that usually undertaken in ethnographic research for example, where the researcher will spend many months or years immersed in community life in order to understand how people culturally construct and experience their worlds (Patton, 2002; Cresswell, 2007; Till, 2009). Patton (2002) contends that shorter-term periods of cross-cultural research are more susceptible to cultural miscommunication and misinterpretation. Ideally, a longer period of time would have been spent on Mota Lava in order to produce better participatory research outcomes. In reality however, the research was constrained by time, circumstances and funding. Further, the months spent living in other communities during the initial fieldwork periods helped to mitigate against a certain degree of cross-cultural misunderstanding and to build a foundation of understanding about ni-Vanuatu society, livelihoods, language and culture.

3.5.2.3 Storian participants

Table 7 breaks down the number of individuals directly involved in *storian* on Mota Lava. A total of 71 individuals participated in interviews and opportunistic discussions. However, many more participants than this were involved in the research less directly via participant observation. The figures shown in the right hand column of the Table 7 represent only those who partook in notable

[33] The fieldwork term was longer than that which would be normally undertaken for a participatory vulnerability and adaptation assessment. Community-based assessment in the CBDAMPIC Vanuatu project was undertaken for one to two weeks only. I recognise that the objectives of such assessments are different from my research, however.

opportunistic discussions as part of participant observation. Similarly, the figures given in the left hand column represents 'core' participants in interviews and does not count additional participants who contributed intermittently throughout interviews. Many individuals participated in both interviews and opportunistic discussions, but are only counted once in the table.

Table 7 Number of participants in interviews and opportunistic discussions by gender

	Interviews	Opportunistic discussions: Participant observation	**Total**
Male	25	14	**39**
Female	9	23	**32**
Total	**34**	**37**	**71**

A possible limitation of my research is that the number of participants does not make up a representative sample of the island population. In qualitative research however, samples are rarely intended to be representative as in quantitative research. Rather, sampling is *purposeful* (Patton, 2002; Bradshaw and Stratford, 2005). Given time constraints and the importance of personal relationships in *storian,* interacting with fewer participants in greater depth was more appropriate than breadth.

During my fieldwork, participants were selected using two types of purposeful sampling methods: *snowball* and *opportunistic* (Patton, 2002). For interviews, I aimed to involve participants who were particularly knowledgeable about the community as a whole and its history, for example: chiefs, church leaders, committee chairpersons, school teachers and elders. I used snowball sampling to identify these participants. As 'changes over time' became an important point of discussion in my research, I purposefully invited a large proportion of older participants to contribute. However, I made a particular effort to also include the

voices of younger participants as they often had a different perspective on aspects of socio-cultural change. A breakdown of participants by approximate age category can be seen in Table 8. It should be noted that most participants did not know their exact year of birth.

Table 8 Number of participants in interviews by approximate age

Younger (18-35)	5
Middle-aged (35-60)	11
Older (61-80)	18
Total	**34**

I attempted to involve participants from all five villages on the south-western peninsular of Mota Lava. However, my local research counterpart – who's family I lived with in Nerenigman – played a central role in identifying and inviting participants, particularly in the initial stages of the fieldwork. As such, many participants were family and friends of my host family. A large majority of participants were therefore from Nerenigman. Nevertheless, I managed to involve at least two participants from each other village.

I used an opportunistic sampling method in conjunction with snowball sampling. Opportunistic sampling allowed the flexibility required with participant observation, enabling me to take "advantage of whatever unfolds as it unfolds" (Patton, 2002: 240).

3.5.2.4 Storian and gender

Table 7 reveals the importance of mixed methods in enabling both men and women's voices to be represented. I found early on that a more formalised interview context was more suitable and comfortable for male participants, whilst an opportunistic discussion context was more suitable and comfortable for

female participants. Hence, far fewer women participated in formalised interviews than men. Women are constantly engaged in household, caregiving and livelihood duties and therefore generally have less time than men to 'sit around and *storian*'. Because of this, most data collection with women was undertaken whilst participating myself in these tasks so as not to detract from busy work schedules. It was also more culturally acceptable for me to be a participant observer in women's activities, being female myself.

Importantly, I found that women often felt intimidated and shy in more formalised interview contexts. My positionality influenced this. As a *misis*, my position as a female was both 'insider' and 'outsider'. Often, I was regarded as an 'honorary man' – for example, my male friends would take me to the kava *nakamal* (kava 'bar') for *storian* on a regular basis, a space where no local women can go. In many ways I participated in the community like a man, for example: speaking at public meetings; having male friends; being invited to the homes of chiefs, and; having come to Mota Lava unaccompanied. Perhaps because of this, I was regarded as a distinct 'outsider' in an interview context with women. In other contexts however, I was readily accepted as an 'insider', for example when assisting women in a two-day feast preparation for a community father's day celebration. In this type of context, I was able to form close rapport with women, perhaps because my behaviour and conduct was closer to that with which they were familiar. A shortcoming of this gender division in methods is a discrepancy in the way data was able to be recorded and represented. Interviews were largely digitally recorded, while opportunistic discussions were not. Field notes from opportunistic discussions are by nature less complete and faithful to the original than digital recordings. Thus, women's voices represented in this thesis may be more filtered through my own perceptions than men's. Since direct quotes require digital recording, a large majority of the quotes in Chapters Four and Five are male voices.

3.5.2.5 Key informant interviews

Key informant interviews were conducted with at least 40 members of governmental, non-governmental and donor organisations based in Port Vila, Luganville (Santo) and Sola (Vanua Lava), between 2006 and 2008. The purpose of these interviews was to provide general contextual information, direct me towards particular data sources, gather specialist knowledge and viewpoints and better understand community-based data (Patton, 2002). Table 9 outlines the organisations with which key informants were affiliated.

Key informant interviews provide the background to this research and with a few exceptions, are not directly referenced in Chapters Four and Five. Occasionally, key informant interviews were digitally recorded and transcribed. Consent forms for key informant interviews can be found in Appendix Six.

Table 9 Organisational affiliations of key informants

Government organisations
Vanuatu Meteorological Service
National Disaster Management Office
Department of Forests
Department of Lands
National Statistics Office
Department of Agriculture
Rural Economic Development Initiative
Vanuatu Cultural Centre
Malvatumauri (National Council of Chiefs)
National Council of Women
Environment Unit
Torba Provincial Council
Sanma Provincial Council
Shefa Provincial Council
Non-Governmental organisations
Vanuatu Red Cross Society and French Red Cross in Vanuatu
Save the Children
World Vision
Foundation of the Peoples of the South Pacific
Live and Learn Vanuatu
Wan Smolbag
Vanuatu Association of NGOs
Oxfam
Wantok Environment Centre
Volcan
US Peace Corps
Donors and regional organisations
New Zealand High Commission
AusAid
European Union
United Nations Development Programme
South Pacific Regional Environment Programme
Victoria University of Wellington
University of Waikato

3.5.3 Analysis and write up

Hickey and Kothari (2009: 86) state:

> [Participatory] research is not a mechanical process where data is collected in one place and then analysed "back home" but an iterative and flexible process where information is collected and analysed in the field and issues that arise feedback in to the process.

Data analysis was an on-going process throughout fieldwork, assisted by participants themselves. Emerging themes were discussed and evaluated with participants. From this, further important themes could be identified and investigated. Importantly, the closing stages of my fieldwork were what Patton (2002) refers to as 'confirmatory'. Data collection in the final two weeks of fieldwork triangulated and (dis)confirmed patterns that appeared to have emerged. Fieldwork culminated with a community meeting where themes were shared and discussed at length.

Because of limited electricity and time, transcription of recorded interview data had to wait until I had left the field. Most interviews were transcribed verbatim, in *Bislama*. Transcripts, hand written interview notes, field notes from opportunistic discussions and field diary entries from participant observation were analysed manually using a coding system. Analytical insights and interpretations that emerged during data collection formed the organisational basis for distilling the data into key themes (Patton, 2002). 'Descriptive codes' (Cope, 2005) were developed to systematically identify key themes in the data. Descriptive codes reflected categories of data, such as data relating to the themes of: '*kastom*', 'population', 'education' and 'disaster relief'. I developed sub-categories under each major descriptive code, for example, under the descriptive code '*kastom'*, data was grouped into sub-categories of 'loss of *kastom'* and 'practices based on *kastom'*. This coding process acted to 'package up' the data into manageable pieces that could then be interpreted, compared and written about.

In an effort to reflect local voices as accurately as possible in the write-up of this research, Chapters Four and Five contain as many direct quotes from interview transcripts as space allows. Because of word length restrictions, most quotes are presented in English only. I recognise however, that even the inclusion of quotes is not free from issues of representation and power – particularly as only some participants' voices are able to be represented in this way (Mansvelt and Berg, 2005).

3.5.4 Ethics

The research was approved by the Human Ethics Committee of Victoria University of Wellington, (June 2008) and then by the Human Research Ethics Committee of the Faculty of Humanities and Social Sciences, University of Waikato (January 2009) (see Appendix Seven). The research was also approved under Vanuatu's Cultural Research Policy. All cultural research undertaken in Vanuatu by overseas nationals must be approved under this policy, to ensure that it is beneficial to ni-Vanuatu. As outlined in the ethics consent information provided in Appendices One through Three, all participants remain anonymous in this thesis. Pseudonyms are used when quoting participants in Chapters Four and Five .

3.6 Reflections on participatory practice and process

This section is taken from a paper entitled: 'Ethics and methods in research for community-based adaptation: reflections from rural Vanuatu' (Warrick, 2009). This paper was published in a special edition of '*Participatory Learning and Action'* on CBA, in late 2009. The content is altered in places. The purpose of this section is to reflect upon participatory research practice and techniques engaged in the three case studies throughout the course of my fieldwork. The section outlines how (and why) I altered my methods to maximise participatory best-practice, in as far was possible within the bounds of PhD research. The paper on which this section is based, delivers on calls for "honest, critical reflection" in CBA research and practice in order that practitioners and researchers can learn

from each other's experiences (Reid et al., 2009: 23). The paper is designed to be read by practitioners and therefore keeps referencing and 'theorising' to a minimum.

3.6.1 Participatory processes in the wider research context: who benefits?

During the research I worked in conjunction with the Vanuatu Meteorological Service (VMS) and the Vanuatu Cultural Centre (VCC). The VMS is the government department in which the coordinating office of the National Advisory Committee on Climate Change (NACCC) is housed, and through which most climate change projects and activities are executed. The VCC is a statutory body core funded by government under the Ministry of Internal Affairs, responsible for documenting indigenous knowledge.

A fundamental principal of participatory research is that it should be in response to a locally identified need, from inception to outcomes (Kesby et al., 2004; Kindon, 2005; Howitt and Stevens, 2005). The research was designed, developed and carried out with key input from in-country stakeholders to ensure it would be useful to ni-Vanuatu. The broad research focus was defined in response to a need identified by the VMS. The case-study field sites were chosen in response to VMS-identified data gaps – case study communities were located in areas where no prior vulnerability and adaptation (V&A) assessments had been carried out or documented. Selener (1998: 18) contends that a key pillar of participatory research is that "the problem originates in the community itself and is defined…by the community". Although procedures were obviously followed to ensure the communities wanted a researcher looking at climate change to work with them, the research was not requested by the communities themselves. Internal understanding of the need for adaptation is likely to be low in Vanuatu communities and this has obvious implications for the nature of participation.

Another key principal of participatory research is *sharing* knowledge, rather than extracting it, and building the skills and capacities of the people involved (Kesby, Kindon and Pain, 2004; Kindon, 2005; Howitt and Stevens, 2005). In each

community I worked alongside a VCC fieldworker volunteer (or equivalent). VCC fieldworkers are community members trained in research methods, who can serve as 'gatekeepers' for foreign researchers doing cultural research in Vanuatu. Through this collaboration the fieldworkers gained an in-depth understanding of climate change issues and community adaptation priorities which will enhance knowledge sharing and help to facilitate learning and action past my visits. Building community awareness and understanding of climate change was also important to my research – this is discussed in Section 3.6 below. The results of the research will be used by the VMS to assist in adaptation project development. Although Vanuatu currently lacks on-going adaptation projects at the community scale the research is intended to increase the knowledge base in Vanuatu to enable this to occur, particularly as part of the implementation of Vanuatu's National Adaptation Programme of Action (NAPA), completed in 2007.

I concluded each fieldwork visit with an interactive community meeting where the knowledge created throughout the research process was shared and discussed. This provided a good opportunity for triangulation, but also further knowledge exchange – there was a great deal of interest and discussions often continued well into the evening. In addition, knowledge has been documented in short reports (in *Bislama*) and sent back to community leaders. This was at the request of leaders themselves, as they felt that having a 'formal' documentation increased legitimacy and pride in the consolidated knowledge, thus increasing motivation to address the issues highlighted by the community.

In participatory research, the researcher should ideally work through an organisation engaged in on-going community work in order that actions can be supported following the completion of the research (Rambaldi et al., 1995). Being within the constraints of a PhD, however, my 'on-the-ground' research was not linked to a specific project or to funding, and there was no promise of externally facilitated follow up activities in the particular communities involved. There are few organisations engaged in relevant and on-going community-based

project work in the outer islands of Vanuatu that I could have successfully linked up with. I recognise that where there is no clear, tangible or material benefit for the community, the ethics of such an approach may be questioned. On the other hand, ethical concerns may relate to on-going adaptation work that is not informed by a foundation of intensive, detailed research. Further, there is merit in research not directly linked to a project or to sponsors as this avoids bias or restrictions that inevitably result from needing to work within a funding institution's worldview or policies (Brydon, 2006). With growing funds becoming available for CBA, it is important that projects and programmes are informed by comprehensive, locally focussed research in order that funds are spent in the best way possible for the people affected. CBA is a complex issue that needs to be approached carefully; in many respects, neither community nor outsiders are 'experts' in CBA.

I recognise that the 'research only' context of my research may be ethically questionable from a participatory research perspective. This is particularly the case in the CBA field where an 'it's time to take action' rhetoric is prominent. For the purposes of this thesis I will now restrict discussion to the ethics and quality of various participatory methods used within my research, accepting that the 'research only' context may be, in itself, going against the grain of true participation. As is evident throughout the following section, I altered methods to maximise positive participant learning outcomes, wherever possible.

3.6.2 Limitations and strengths of participatory techniques

Table 10 summarises the specific participatory techniques applied and highlights the main strengths and limitations of each in this particular research context. Further information about each participatory technique can be found in Appendix Four. The research itself took on a 'learning by doing' approach – participatory techniques were trialled and modified as needed to better suit both local community situations and research requirements.

All methods were gender segregated as this was best suited to local cultural situations. Group activities used existing groupings within the community (usually church-related groups) so as to limit intrusiveness and difficulties with logistics. Activities such as maps and calendars used marker-pens and butcher paper. Groups generally consisted of between 5 and 15 individuals. Some were age specific (for instance, historical timelines were undertaken with elders). All research activities were undertaken in *Bislama* (Vanuatu pidgin).

Through a participatory approach I intended to maximise community benefits via the research process itself, even though I was unable to provide material outcomes. The intention was to facilitate community learning and empowerment through collective discussion of problems, knowledge consolidation, opinion sharing, and realisation of existing capacities. In reality, the degree to which I was able to achieve all of these ideologies was less than expected. This subsequently influenced the methods I decided to emphasise in the assessment; 'interviewing' methods emphasising participant-researcher knowledge exchange were generally more successful than larger-group activities aimed at collective participant-participant knowledge sharing. However, I do not view this as a 'failure' of participation. Rather, a flexible and relatively non-time constrained approach enabled a successful method – *storian* – to be developed and emphasised.

Table 10 Strengths and limitations of participatory techniques employed in the research context

Method	Strengths	Limitations
Seasonal calendar	Highly beneficial to researcher for understanding relationships between natural resource-based livelihoods, climate, weather, extreme events and disasters	Limited learning outcomes for participants as the complex and time consuming construction of the calendar allowed little time for discussion. Would be better done in two sessions; one for construction, one for discussion. Participants

		were unfamiliar with a 'calendar' format and therefore reluctant to engage
Community and resource mapping	Beneficial to researcher and participants for identifying locations at risk and access to resources and services important to livelihoods and coping with disaster	Maps generated superficial information as construction was time consuming at the expense of discussion – participants concentrated on drawing an accurate map. Best done in two sessions to allow for in-depth discussion
Matrix rating e. g. of resource use, coping strategies etc.	Good for stimulating group discussion and interaction as the rating is impossible to do with one or two of the most vocal or confident group members only. The concept is relatively straightforward and the matrix grid can be prepared beforehand leaving more time for discussion	Limited outcomes for researcher as the ratings tended to be 'ad hoc' disguising complex contextual and temporal differences
Focus group	Few	Shyness and overall reluctance to participate in the absence of a visual activity around which to focus discussion
Transect walk	Flexible, interactive, informal, enjoyable for participants, informative for researcher. Very useful for researcher orientation early on in the research	Can be difficult to maintain focus as many issues are addressed. Limited participant learning outcomes as limited opportunity for collective discussion about any one topic
Historical timeline	Effective catalyst for discussion regarding changes and trends over time in coping strategies etc. Effective tool for analysing the underlying drivers of	Time consuming, easy to get off track

	vulnerability. Best done over multiple visits with a small group. Enjoyable for older participants	
'*Storian'* : Semi-structured and informal interview	Effective for building rapport enabling in-depth participant-researcher knowledge exchange and accurate representation of concerns. Enables depth of discussion necessary for understanding underlying drivers of vulnerability. Less intrusive to daily life than group activities	Little participant-participant collective knowledge exchange and consolidation
Observation	Non-intrusive, effective for building rapport, informal and enjoyable for participants	Time consuming for researcher and unstructured

3.6.2.1 Limitations

Limitations are mainly with regard to group methods. I emphasise however, that these limitations were largely a result of research context. In a more practically orientated project setting, group methods may have been more effective. Most limitations stemmed from the difficulties of being a single researcher working independently from a project, from the low priority of climate concerns in the communities, and from the cultural specificities of ni-Vanuatu society.

Participant outcomes

Although group activities often generated a good participatory *appraisal* – rapidly reflecting information and opinions across a range of stakeholders – collective knowledge creation, capacity realisation, and facilitated learning was limited. Due to my relative inexperience as a facilitator, my status as a community and cultural outsider, and logistical problems with facilitation as a single researcher, I felt that I was unable to create the environment to achieve this. Group activities often felt forced and 'unnatural', with participants reluctant to interact or engage in the activity or discussion. In some instances, I sensed

that more educated participants found the activities somewhat patronising. In other instances, less educated or older participants were confused, shy and unwilling to voice viewpoints. Finding a balance in the group setting was a challenge.

A major limiting factor in the Vanuatu context was that participants often expected me to lead the activity in a 'school teacher-pupils' type format, and were unaccustomed to interacting and discussing freely in a group. It was often difficult to convey that discussion and opinion sharing was the most important part – not drawing an accurate map, for example. In the communities, organised group meetings and decision-making processes are usually led by a 'chairman' or other leadership figure, with people contributing in turn. Another contributing factor may be the nature of 'awareness talks' administered by NGOs, aid organisations and government in rural Vanuatu; local people told me that these mainly consist of an 'expert' administering a lecture. As such, an 'in-expert' outsider (me) *facilitating discussion and interaction* may be an unfamiliar and 'unnatural' concept.

This meant that the purpose of the group activities was somewhat unfulfilled, given that I often ended up leading instead of facilitating. For example, in the seasonal calendar exercise participants requested that I stand at the front of the group and ask questions which they then answered. Although this generated useful information for me, participants learning outcomes were not as great as I had hoped. Similar situations arose when my local counterpart facilitated the activity instead of me. It is probable that this type of activity would work better in a planning context, where clear outcomes would result. Having said this, engaging in the activity itself may have contributed to the process of consolidating and clarifying knowledge and viewpoints, despite seemingly reluctant participants.

Research outcomes

Group activities were beneficial to my research in that they provided triangulation and a range of information in a short time. They were also useful for highlighting issues for further follow-up. However, the majority of information generated was superficial due to time constraints and group size, with most time and effort dedicated to completing the actual activity (such as drawing the map or constructing the seasonal calendar) rather than to discussion. Often it was the *reasons* behind the answers given that were most important, however group situations were not always conducive to exploring these.

Group activities generally had the capacity to generate good information regarding direct climate-related problems, ways of coping with them, and the strengths and weaknesses of these. In the context of CBA however, it is important to dig deeper in order to understand the indirect situational factors and processes determining this over time, as these will ultimately shape the ability of a community to generate their own solutions to climate stress and increased uncertainty in the future. This required lengthy and in-depth discussion difficult to achieve in the large-group activity setting. Successful instances were facilitated by smaller groups and by approaching the exercise informally; generally starting with an informal discussion with the actual activity as incidental.

Ethics

Due to these limitations, I decided to limit the use of large-group activities, instead emphasising interviewing techniques. Group activities are time consuming and thus disruptive to daily subsistence and economic activities. Climate stress is not generally viewed as a priority concern in the community, meaning interest in the activities was often low. Although participation in the research was obviously voluntary, I felt that given the 'research only' context,

participants were not receiving enough gain from group activities to justify this intrusiveness on their busy daily lives.

It may be the case that in a project or decision-making context with tangible benefits to follow, these participation limitations would have been less. A major difficulty I faced as a single researcher was a certain lack of motivation to attend and engage in group activities. Perhaps if the group activities were for the purpose of direct planning for material or tangible outcomes, intrusiveness would be justified and participant interest and enthusiasm may have been heightened, thus better enabling collective knowledge exchange and learning.

3.6.2.2 Strengths

Storian successfully facilitated participant-researcher knowledge exchange, thus catalysing further knowledge sharing among community members. This was largely at the expense of extensive *collective* participant knowledge sharing and exchange, but most beneficial to both participants and researcher in the particular socio-cultural and research context. Box 4 provides an example of *storian*

Participant outcomes

Storian provided a research format with which the majority of participants were comfortable. To '*stori*' is culturally a central and normal part of daily life. Knowledge is traditionally disseminated orally in Ni-Vanuatu culture. I found *storian* to be the most 'natural', non-threatening and enjoyable research method for participants. Many community members enthusiastically volunteered themselves for discussions, and were happy to dedicate long periods of time to *storian.* Many participants who displayed shyness in group situations – especially women and elderly participants – were more comfortable with voicing their opinion in a more personalised situation. Importantly, *storian* was generally less intrusive to daily commitments than group activities.

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Excerpt from a *storian* on Mota Lava, November 2nd 2008 (English translation)

I am talking to participants A and B about the impacts of tropical cyclones (*hariken*), while we work in B's garden:

Me: *So when the* hariken *came in 1939 you must have been 10 – do you remember it?*

A: Yes! That's how I know I was born in 1929! Every tree went down, we were in Nerenigman [village] and we could see everyone at Totolag and Queremande as they made their cooking fires in the morning … there was a white man that had a small store on Ra island where my father worked and that day I went with him – and the big wind comes now! It came, it came, until it pulled off the roof belonging to the white man … the sea carried everything from the store right up into the middle of the island! We went and dug out tinned fish, soap – all things belonging to the store.

B: Worst *hariken* – we can't remember a worse one.

Me*: You had a* hariken *this year – can you tell me about that one?*

B: Food shortage now! Oh yes. First time is this year. Small, small *hariken* but…

A: Plenty *hariken* have hit us but we have not had food shortage. But this year – we have a shortage!

Me: *So in 1939 do you remember a shortage?*

A: Small, small. But all the old people before, they had good gardens and they stored plenty of dried breadfruit.

B: In 1972 it was the same. The gardens were strong.

Me: *So what's different now?*

B: I can't tell you straight – but I think it's because of a lazy fashion now! Oh, yes, they'll say they don't have enough land now, but the real reason is they don't want to work. There is enough land. We must plant something every day to make sure we have no shortage of anything – that was the fashion of the people before…

A: Custom! Custom belonging to us … must plant banana, taro or what – every day

B: That was teaching belonging to our grandparents, that was the talk we use to hear in the *Nakamal* [meeting house], that was the talk we use to hear in the gardens with our parents. That was the talk before – before school came to Mota Lava. Plant plenty, plant a strong garden, then if disaster comes, you have food.

A . . . losing custom, that's why it happens. Losing the custom fashion belonging to the old people before.

Box 4 An example of *storian*

The approach was flexible – although guided to a degree by topic, I ensured that discussion was led primarily by participant responses, enabling participants to highlight issues most significant to them. Importantly, knowledge generation was a two-way process; the relaxed and highly personal context of *storian* provided an opportunity for participants to ask questions of me. In this way, *storian* became an important platform for raising awareness of climate change issues in the community. Furthermore, through the course of discussion and issue probing, links between climate-related problems (such as decreasing food security after cyclones) and more general problems (such as loss of traditional knowledge and ineffective community governance) were clarified for participants as well as the researcher. In this way, the research was interactive, not extractive.

Research outcomes

One of the most significant benefits of *storian* – to both participants and researcher – is that it allows peoples' perspectives and cultural constructions of issues to be more adequately reflected as they talk around the topic in their own way. This enables the relative priority of climate-related problems in a context of multiple stressors to be better represented. This is fundamental to successful CBA as community-based initiatives or projects need to directly address locally perceived needs and cause 'no-regrets'. *Storian* often began with an extensive discussion of general problems and concerns in the community before addressing anything climate-related. Group activities were often either too climate stress-focussed or too general to allow this relative priority to be accurately represented.

The *storian* technique built participant-researcher rapport. This personal rapport was fundamental to the 'accuracy' of information created. In a project setting, concise participatory workshops are a good way of obtaining a range of viewpoints in a relatively short amount of time, as a basis for planning and action (van Aalst et. al, 2008). However, this can have its limitations as well as its

strengths. Based on experiences in Papua New Guinea, Mercer et al. (2008) identify that information gathered in initial scoping research can be incomplete and skewed in order to maximise assistance from external agencies. This is inevitable to a degree as a researcher will always have an agenda of which participants are aware, whether or not this involves an eventual material outcome. In my own experience I found that information (in both group activities and *storian*) was often initially biased towards what participants believed I wanted to hear – this was the participants way of being polite to a 'guest' in the community. In a project setting the consequences may be more significant – information may be bias towards obtaining aid or specific project outcomes. During the course of *storian,* as personal relationships were built, discussions became far more frank. This is an important point to stress because CBA initiatives built upon less intensive and detailed assessment may be skewed towards the known agenda of the implementing agency and thus may not be integrated with true community priorities. This is particularly important in communities like the three I visited, where the implications of climate change or climate stress are not a local priority and a more pro-active approach to adaptation is required. *Storian* was often used in conjunction with a participatory activity (such as map drawing); however, *storian* would be the primary focus with the activity as incidental.

3.6.3 Climate change communication and participation[34]

Climate change adds an additional layer of complexity in PLA. Many toolkits aimed at CBA are based on those intended for disaster risk reduction. The difference is that knowledge of potential future changes in climate – and therefore an understanding of the need for adaptation – is largely held by 'outsiders' and is thus, in a sense, 'top down'. This creates particular challenges,

[34] This section was greatly enriched by discussion with Rebecca NcNaught, Senior Programme Officer for the Red Cross/Red Crescent Climate Centre (Rebecca McNaught, pers. comm., 01. 07. 10).

especially as CBA is ostensibly a community driven process with local people, rather than outsiders, as the 'experts' in adaptation processes. In Vanuatu, addressing climate stress is not generally a community priority; although at times extremely disruptive, cyclones, drought and flooding are viewed largely as part of 'normal' life. Furthermore, where the implications of climate change are not yet obvious, motivation for adaptation (even if this is merely improved disaster risk reduction) is likely to be external, at least in the early stages. This has obvious implications for the extent to which CBA can actually be community driven. Effective communication of climate change knowledge is fundamental to effective community participation in CBA processes. Here, I discuss and reflect upon the ways in which I communicated and emphasised the notion of climate change in *storian* and other activities.

3.6.3.1 Communication methods

I held a number of interactive and informal 'awareness sessions' with communities throughout my fieldwork. I conducted these as open community events but also with existing community groups such as women's and youth groups. The sessions were conducted in *Bislama* and used posters explaining climate change and its impacts, developed by the Vanuatu Meteorological Service. An initial presentation by me was followed by an extended 'question and answer' session. Most people in the communities had heard of climate change on the radio, but few knew what caused it or what its impacts would be[35].

Storian was important to effective communication. Relaxed discussion with individuals, families and groups as part of everyday activities – e. g. going to the

[35] Children and teenagers often had a better understanding than adults as they had learned the basics of climate change at school. Young people are potentially a useful resource in community climate change communication, particularly as they may be more familiar with 'scientific' concepts like weather systems and gasses (see also Plush, 2009). Young people are well-placed to assist in educating adults, as they are able to frame the concepts in culturally understandable ways.

gardens, collecting firewood, eating together – was particularly effective in ensuring participants understood the concepts. Personal interactions provided a setting where participants were comfortable asking questions and issues could be discussed in depth. I found that the 'awareness sessions' were useful for introducing the concepts but that once these had 'sunk in', participants had many more questions and concerns they wanted to discuss in a more personalised setting. In Vanuatu, one of the most effective ways of raising community awareness about an issue is to educate local leaders (i.e. chiefs, women's group chairperson, school teachers, local government representative) – the message will 'infiltrate', person-to-person through the community's own local modes of knowledge dissemination.

Simplicity and the use of context-specific metaphors were particularly effective in framing climate change in locally relevant terms. It is important to not get too bogged down in the science, or in detail. It is important that people have something familiar and local to 'hook' the scientific concepts onto. For example, 'the greenhouse effect' makes little sense at the community scale in Vanuatu, as few people have seen a greenhouse. Instead, I used the metaphor of a corrugated iron house – when the sun shines it gets hotter inside the iron house than outside because the sun's 'warmth' gets trapped. The processes that cause this are not the same as the greenhouse effect of course, but it enabled participants to comprehend the broad concept. Box 5 contains a simplified outline of my communication strategy (translated from *Bislama)*.

Communicating climate change

1. What causes climate change?

- Climate change is caused by gasses that are created by activities like burning diesel, driving cars and cutting down trees.
- The gasses go up into the atmosphere.
- This causes some of the sun's rays to get trapped causing the world to get warmer
- This causes changes to the weather systems all around the world – it doesn't just mean that everything will get warmer.
- Changes to the weather systems can cause changes in rainfall, temperature and seasons. It also can cause increases in tropical cyclones, droughts and floods.
- Global warming also causes the sea level to rise. This is because as the world gets warmer, the ice in Antarctica and the Arctic melts. This happens very slowly.

2. Impacts of climate change

- Different places in the world will experience different problems with climate change.
- Give examples from around the world . Africa is getting less rain causing problems with growing crops and causing famine, in Bangladesh, many people are affected by flooding and bigger cyclones etc.
- In Vanuatu, climate change is likely to cause changes in rainfall and cyclones may get bigger and more frequent. Vanuatu might get more droughts. Sea level rise might cause problems because many people live near the coast.

3. Communicating uncertainty and adaptation

- Scientists don't know exactly what will happen with changes in the weather.
- There are ways of slowing down climate change by removing gasses from the atmosphere, like planting trees.
- Many developed countries are doing this but some climate change will still happen – we can't stop it completely.
- This is why it is important that countries prepare for climate change by improving their ability to cope with weather problems already experienced. That way, if they get worse, communities will be able to deal with the increased problems better.

Box 4 Climate change communication strategy

3.6.3.2 Empowerment: avoiding doomsday scenarios and promoting self-knowledge

Raising awareness of climate change in a socially sensitive way is an important part of empowerment for CBA; a sound understanding of climate change knowledge is necessary if adaptation decisions are to be made locally (Tschakert and Sagoe, 2009). Effective communication frames the climate change problem in terms that local people can understand without generating unnecessary fear or concern. At the same time, it is important that communities recognise the necessity of adaptation – it is important that communities are motivated to action adaptive activities. During my own fieldwork I strove to find a balance between encouraging local action on adaptation and creating unnecessary stress and concern via my communication of climate change knowledge.

I found that initially, many people perceived climate change as an unfamiliar, daunting and insurmountable challenge despite my efforts to explain its incremental nature. For example, participants were commonly fearful that as they inhabited low-lying coastal land, their village and land would quickly become uninhabitable because of the sea level rise I was telling them about. In response, I explained that this was a very rare occurrence and that it was more likely that coastal erosion and storm surge would get worse over time. The community possesses much knowledge and capacity to reduce these familiar risks themselves, making the problem less daunting and more manageable. I found that generally, once I explained that climate change impacts were unlikely to be insurmountable, participants' fears were allayed and their capacities self-recognised. Extensive discussion and knowledge exchange was necessary in this regard – not just in the 'awareness sessions' but in regular social interaction.

I found that it was most constructive to frame climate change impacts primarily in terms of incremental increases to the weather-related disaster risks already

faced[36]. For example: big cyclones might come more often; when there's a storm the waves might come further inland; the erosion by the coast might get worse; the dry season might get longer; flood events like the one last year might come more often. This placed climate change – a problem based in 'outside' knowledge – within their realm of expertise, as they are already 'experts' in dealing with climate variability and extremes. I found that this approach encouraged participants to consider what they could do better to cope with disasters – a positive and empowering outcome irrespective of climate change.

Although 'doomsday scenarios' should be avoided, it is also important not to downplay the potential impacts of climate change – this may lead people to perceive that climate change is not worth doing anything about. I found that talking about what other communities were doing in Vanuatu and the wider Pacific to prepare for climate change and disasters was particularly effective in this regard – that other communities similar to themselves were concerned enough to do something, helped to legitimate the problem for participants. In Vanuatu, experience from community-based development and resource management shows that the 'catalyst effect' is the most successful approach to gaining support for projects[37]. The 'catalyst effect' is where communities and individuals are motivated by the experiences and successes of others like themselves. For example, in one community I worked with, a local leader had built a traditional-style cyclone shelter that could also be used for firewood

[36] Of course, this may not be the most appropriate approach in communities where the impacts of climate change will differ markedly from current climate stresses faced, or where there is scientific certainty that impacts will exceed capacity to cope with experienced variability and extremes.

[37] This is true throughout the Pacific – evidence-based, 'peer to peer' knowledge exchange is a proven successful mechanism for increasing community motivation and support for environmental initiatives. An example is the successes of the Locally Managed Marine Area Network (William Aalbersberg, pers. comm., 01. 07. 2010).

storage. Other families observed the usefulness of this initiative and followed suit, learning the traditional methods from each other.

Some aspects of climate change communication risked creating a sense of disempowerment among participants. I found that overemphasis on the notion that climate change is a problem caused by developed countries created a certain sense of 'victimisation'. This is a difficult issue because a balance must be found; climate change *is* a problem that has been created primarily by developed nations and it is ethically important that communities know this. However, I noted that dwelling on the inequalities too did little to encourage adaptive action. Many expressed the opinion that as developed countries had caused the problem, it was therefore up to them to provide ways for communities in Vanuatu to adapt – in terms of cost, technology and expertise. Again, although this is not an invalid opinion, the reality is that developed-to-developing country transfers of assistance for adaptation are unlikely to produce effective solutions at the local scale in the near future. This is a key impetus for CBA which strives for self-reliance.

It is important to communicate that climate change is something that happens over large time scales. This is particularly important in a context like Vanuatu, where communities live with high climatic variability and extremes. Often, CBA-focussed PLA toolkits emphasise ascertaining local observations of changes to climate or weather and resultant problems as a basis for developing adaptation strategies (e.g. Nakalevu, 2006; IRFC/RC, 2007). I found that this approach usually over-emphasised shorter term variability rather identifying longer term trends (including increased irregularity and uncertainty) as the toolkits intend. For example, participants in one community claimed to be experiencing increases in various monthly rainfalls, but this perception was likely influenced by the La Niña occurring at the time; local weather station data did not back up this perception. Mataki et al., (2007) experienced a similar issue in their work in Fiji. The Vanuatu climate is highly variable and this may result in people

attributing anthropogenic climate change to problems that likely result (mainly) from 'natural' variability, in participants' minds. In the Vanuatu community context, vulnerability to climate change is primarily driven by decreasing ability to deal with *current* climate stresses (due mainly to social and economic pressures) rather than by 'weather changes' *per se.* In this situation, I found that this approach risked erroneously blaming climate change for decreases in adaptive capacity. The consequences of this may be a sense of disempowerment amongst participants; although climatic variability and extremes have been locally dealt with for generations, I observed that many began to discuss these problems as stemming from forces outside community control and therefore, as requiring externally driven (by government, aid donors and NGOs) solutions. Creating a sense of 'victimisation' is not particularly constructive in the context of CBA in Vanuatu.

Communities in Vanuatu have been effectively adapting to climate variability and extremes for generations. Some of the best capacity to adapt to climate change is therefore already possessed by communities. It is a task of CBA to empower communities to engage this capacity. I noted that dwelling too much on the unequal nature of climate change causes and impacts, risked framing climate change as 'someone else's problem' – requiring outside expertise. Focussing too much on observed climate changes produced a similar result. I found this risked discouraging participants from self-knowledge and from considering their own capacity to produce adaptive solutions in partnership. Emphasising the ways in which people *respond* to climate stress and the ways in which this has changed over time aided in avoiding this unnecessary misconception and sense of helplessness. I found that maintaining focus on issues which the community could potentially address itself enabled participants to realise and legitimize their own (fairly extensive) capacities to deal with an uncertain climate. I emphasise that this may not make sense in every climate change impacts context. Again, the important lesson here is that different contexts call for different approaches in participatory vulnerability research – in both a cultural and climatic sense.

3.7 Summary

This chapter has outlined the research methodology employed to 'provide a platform for local voices' and investigate local constructions of vulnerability in rural Vanuatu. It has explained progressions in the research in response to critical reflections on research topic, process and methods. In particular, it has examined ethical aspects of participatory practice in CBA and raised important questions about who's knowledge is reflected in vulnerability assessments and how. To do this, it has drawn on critical, participatory and postcolonial geographies. The next two chapters reflect the voices of participants on Mota Lava regarding their own constructions of vulnerability to climate.

CHAPTER 4

Social change on Mota Lava: reducing the size of the adaptive toolbox

4.1 Introduction

Chapters Four and Five reflect local constructions of vulnerability to climate in the Mota Lava community. These chapters are structured according to the way in which participants framed vulnerability in my research. The current chapter examines the broad social and livelihood context from which vulnerability to climate stress arises. Social factors and processes underlie vulnerability to climate stress on Mota Lava because they limit the availability and development of effective local adaptive mechanisms or 'tools'. This chapter outlines these social factors and processes which are priority concerns in the community irrespective of climate stress. The next chapter examines the consequences of these social factors and processes with respect to dealing with climate stress. It examines local adaptive tools in more depth, outlining 'event-centred' vulnerability, or aspects of vulnerability directly related to specific climate stresses.

The way participants constructed their own vulnerability to climate stress follows Allen's (2003) construction of local scale vulnerability. Allen (2003) identifies that vulnerability to specific hazard events – event-centred vulnerability (Chapter Five) – arises from a broader context of 'underlying vulnerability'. Underlying vulnerability is the "contextual weakness or susceptibility underpinning daily life"[38] (Allen, 2003: 170). The focus of this current chapter is the factors and

[38] I use Allen's quote here, merely to illustrate what is meant by a 'vulnerability context'. I emphasise that the terms 'weakness' and 'susceptibility' are not reflective of participant

processes shaping this underlying susceptibility. These factors and processes have little or nothing to do directly with climate or climate change. Rather, they are related to social change.

Participants in my research viewed themselves as less able to effectively deal with and adapt to environmental uncertainty than their recent ancestors. The ability to adapt to climate stresses is shaped by the context of everyday life and livelihoods. This context provides the 'tools' – or vulnerability-reduction mechanisms – with which people are able to deal with environmental stresses and uncertainty. Social change has in many ways reduced the size of the adaptive 'toolbox'. Social factors and processes create a context where people are less able to effectively deal with climate stresses as they arise.

4.2 The adaptive toolbox: shaped by a social apparatus

The overarching theme that emerged from *storian* was that the Mota Lava community is becoming increasingly less equipped to acceptably deal with climate variability and extremes than in the *taem bifo*[39] (time before). This has important implications for adaptation to climate change. The Mota Lava community possess a comprehensive adaptive toolbox, developed over generations of dealing with an uncertain environment. However, this toolbox is

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perceptions. As is discussed in Section 6.2.1 participants do not generally perceive themselves as 'vulnerable' in the context of climate stress. By using this quote I am not indicating inherent weakness or failing within communities, which would risk 'blaming the victim'.

[39] *Taem bifo* is a *Bislama* expression equivalent to "in the old days". How long ago this referred to was open to participant interpretation. With older participants, *storian* were generally focussed on things participants themselves could remember – in their lifetime, and in that of their parents and grandparents, based on stories. *Taem bifo* can mean before or after the rise of Christianity (which was a gradual process but culminated around the late 1800s). Interestingly, this was specified in the other two case studies – which had a Presbyterian as opposed to Anglican missionary presence – with *"taem blong dakness"* which is the *Bislama* term for the time before Christianity.

reducing in size. This reduces flexibility and the range of choice in adapting to current environmental uncertainty. Reduced ability to effectively adapt to current climate variability and extremes means that the community is likely to be even less able to adapt to a wider range of uncertainty with climate change. This indicates that vulnerability will further increase with climate change as variability and extremes increase in magnitude and frequency and/or change in their nature. Climate change is likely to increase environmental uncertainty.

A reduction in the adaptive toolbox is a product of broader livelihood and social change processes that have little to do with climate and that are largely outside direct community control. The reasons for increasing vulnerability are embedded in more distant processes of social change; distant in terms of space, power, time, and culture. As is discussed in the next chapter, this was exemplified in early 2008 when Cyclone Funa struck Mota Lava causing widespread food insecurity.

Participants in my research emphasised that dealing with environmental uncertainty is not a new or undue stress in itself. What is new, however, is that there are now fewer effective inbuilt mechanisms to deal with it. As Thomas stated:

> Disaster [Cyclone Funa] came, it damaged us. I don't know why there was so much damage. Maybe, I think, we have not held tight to the systems from before. We have not held tight to the knowledge belonging to our grandparents. Before, life was easy! A time of cyclone was not a time of hunger. Now it isn't like before. Now everyone is very hungry.

Over time, traditional vulnerability reduction tools have declined, become less effective, or become less feasible or relevant in the contemporary community situation. The decline in effective 'home grown' vulnerability reduction tools leaves gaps in adaptive capacity that, through local eyes, have not been adequately filled by effective contemporary or non-local mechanisms. Reduced

self-sufficiency in coping with climate stress underpins vulnerability, as the non-local mechanisms now largely depended upon are often ineffective and unreliable.

I use the term 'vulnerability reduction tool' to refer to any practice or mechanism contributing (directly or indirectly) to minimising the negative implications of climate stress and environmental uncertainty. Vulnerability reduction tools are what enable the community to live with climate stress and environmental uncertainty without it causing sustained and unacceptable disruption to the structure and function of society. By 'traditional vulnerability reduction tools' I refer to mechanisms that are fundamentally based on 'traditional', 'local' or 'indigenous' knowledge, accumulated by a community through generations of living with climate stress[40]. After Berkes et al. (2000), traditional mechanisms include a socio-cultural framework consisting of: institutional 'rules' for social regulation'; structures for cultural internalisation; and appropriate worldviews and cultural values that hold practices in place. On Mota Lava, this socio-cultural framework shapes livelihoods, which in turn shape vulnerability reduction practices within these. This is shown in Figure 18 below. Changes to the socio-cultural framework and the implications for livelihoods are the focus of this chapter.

So, vulnerability reduction tools do not exist in isolation. They are shaped and sustained by a social apparatus: social systems, culture and values. The social apparatus enables the accumulation, transmission and adaptation of knowledge and practice.

[40] Mota Lava participants held comprehensive knowledge (or familiarity) regarding practices from the *taem bifo*, and were acutely aware of the consequences of the decline in some of these. The proximity of Cyclone Funa is likely to have influenced this, but also, perhaps due to relative isolation, these practices were central to life up until more recently than in other communities I researched with over the course of my fieldwork.

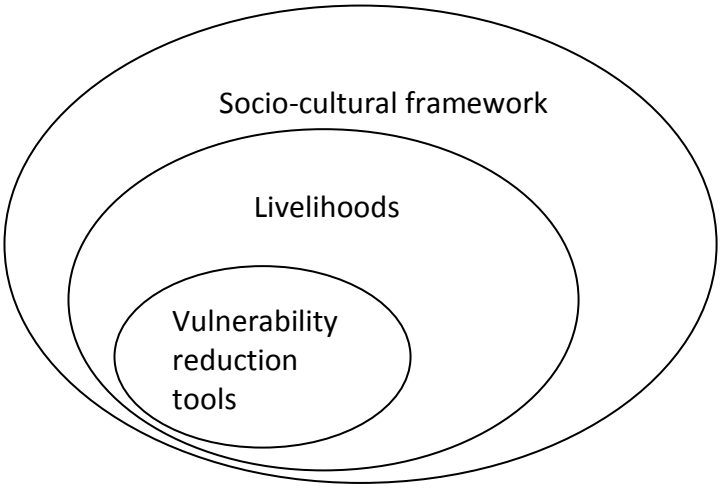

Figure 9 Layers of analysis in vulnerability reduction (adapted from Berkes et al., 2000: 1257). The focus of this chapter is the outer two circles and the interaction between them. This forms the context from which vulnerability to climate stresses arise. The inner circle is the focus of Chapter Five.

The social apparatus is what enables tools to develop and evolve in a way suitable to the local context, particularly as this context changes. Changes to the social apparatus supporting the adaptive toolkit are at the core of decreasing adaptive capacity on Mota Lava.

According to participants, their grandfathers and great-grandfathers were (in many ways, but not all) better able to cope with environmental uncertainty. This was because a wide range of traditional vulnerability reduction tools were available. This is examined in Chapter Five, Section 5.3. Because participants identified these mechanisms as coming from the *taem bifo*, I have used the label 'traditional', but I emphasise that this does not necessarily mean 'old'. Rather, it means mechanisms that are embedded in cultural knowledge, belief and value systems, that are local in terms of space and power, and that are passed from generation to generation (Gorjestani, 2000; Berkes et al., 2000; Agrawal, 1995).

By 'contemporary vulnerability reduction tools', I refer to mechanisms based on 'modern', 'scientific', 'capitalist' or 'Western' knowledge systems and also to

mechanisms with non-local origins. The distinction between traditional and Western scientific knowledge is an area of much debate (Sillitoe, 1998; Agrawal, 1995). Indeed, my distinction of 'traditional' vs. 'contemporary' is for ease of reading; it is not always this dichotomous in reality. In a few cases, traditional mechanisms have been replaced completely by contemporary ones. However, many traditional mechanisms have evolved alongside changes in culture and everyday life to a contemporary form (Sahlins, 1999). These could be more accurately termed 'emerging mechanisms'. Importantly, my definition of contemporary mechanisms includes those that are non-local – dependent upon resources and power structures largely outside of local community control. This is particularly important, as a growing lack of self-sufficiency in dealing with climate stress was a key concern voiced by participants.

4.2.1 The nature of vulnerability on Mota Lava

The factors and processes identified by participants as shaping vulnerability to climate stress on Mota Lava are reflected in a 'Nature of Vulnerability Diagram' (NVD) (Figure 19). Figure 19 explains the structure of the NVD. The purpose of the NVD is to illustrate the structure of vulnerability to climate stress. Its function is to summarise and reflect the factors and processes that are reducing the size of the adaptive toolkit (discussed in this chapter and the next) and to make clear that most of the causes of vulnerability to climate stress: a) have little or nothing to do with climate, and b) stem from non-local processes.

The NVD reflects the way in which local people themselves discussed and represented their own constructions of vulnerability in *storian*. Vulnerability to climate stresses has direct causes, for example, changes in gardening practices (represented in Figure 19 by the blue circle). However, the factors contributing to changes in gardening practices are indirectly related to climate, for example, a general loss of traditional knowledge (represented in Figure 19 by the yellow circle). These contextual causes are shaped by distant processes such as development pathways.

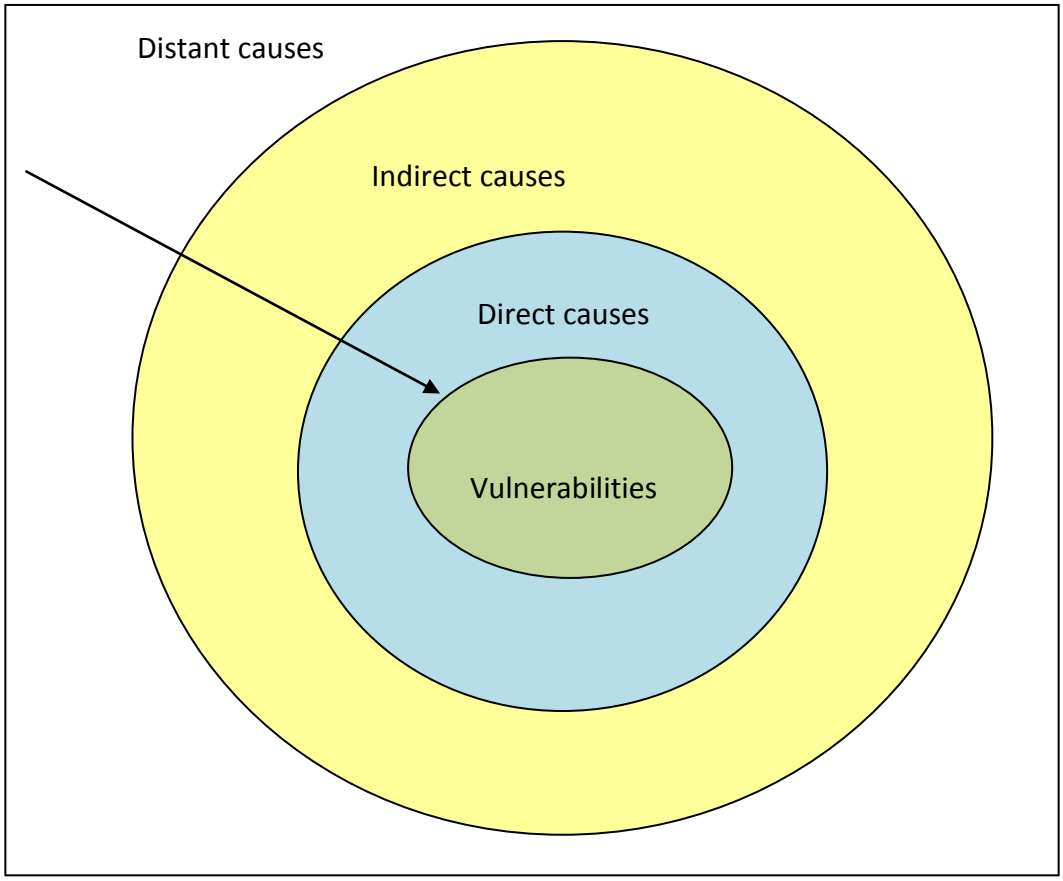

Figure 19 The Nature of Vulnerability Diagram (NVD) framework. The NVD represents the structure of vulnerability at the community scale. The concentric circles represent the decreasing specificity and distance of causal factors and processes to climate stress itself. The blue circle represents factors and processes directly contributing to community vulnerability that are specific to climate stresses. The yellow circle represents factors and processes indirectly shaping these direct contributors. Outside the circles are factors and processes driving vulnerability that are distant to the community and not within their immediate control. The current chapter is concerned mainly with indirect and distant factors and processes.

The structure of the NVD is broadly reflective of the structure of Wisner et al. 's (2004) 'Pressure and Release' model (PAR)[41], in-so-far-as the concentric circles reflect factors and processes influencing vulnerability at decreasing levels of specificity from a particular climate stress. The circles of the NVD progress from factors 'most directly related to specific climate stresses' in the innermost, to those 'least directly related to climate stresses' in the outermost. However, the major point of departure from the PAR conceptualisation is that the NVD does

[41] Although the data 'spoke for itself' and the PAR was not originally used as a template for analysis.

not attempt or advocate any 'chain of explanation' for event-centred vulnerability. Wisner et al. (2004: 52) contend that:

> … an explanation of disasters requires us to trace the connections that link the impact of a hazard on people with a series of social factors and processes that generate vulnerability.

The most distant factors and processes in the PAR are called 'root causes'. I avoid this terminology, instead framing these simply as 'distant causes'. 'Root cause' indicates a series of discrete, direct sources of vulnerability to particular climate events. This indicates discrete event-centred solutions. This is despite Wisner et al. 's assertion that:

> As we move up the chain of explanation from unsafe conditions to root causes, the linkages (and therefore the level of precision in disaster explanation) becomes less definite. In analysing the linkages between root causes, dynamic pressures and unsafe conditions it becomes increasingly difficult to have reliable evidence for causal connections, especially as we go further back in the chain of explanation (Wisner et al., 2004: 61).

Local framings in my research indicate that "disaster explanation" is seldom linear, and that searching for a linear explanation in analysis seldom makes sense through local eyes, or produces effective outcomes in practice. Based on local community perceptions of vulnerability to climate stress in my research, attempting a 'chain of explanation' is unlikely to have effective or sustainable vulnerability reducing outcomes, as the factors and processes shaping vulnerability to certain biophysical stressors are multiple and interlinked. As such, I reject the "chain of explanation" discourse underpinning the PAR. Each circle in the NVD indicates a complexly interwoven layer of factors and processes that create a context from which vulnerability arises rather than attempting to specify direct relationships between factors in different layers.

As in the PAR, the NVD reflects that vulnerability – literally and non-literally – is a product of factors and processes operating both at a distance, and 'close to home'. The concentric circles show the layers of vulnerability causality, indicating the 'nested hierarchy' (Smit and Wandel, 2006) of factors and processes generating a situation where people are vulnerable – and resilient – to climate stress. The distant causes contained in the NVD are largely external to the community in terms of space, power, time and 'visibility'. Development processes at a provincial, national and international scale shape the community's access to particular livelihood resources and opportunities, for example. These factors and processes are distant in terms of space and power. Some of these factors and processes are also distant, temporally. The land-use decisions of recent ancestors influence famine food production in the contemporary situation, for example. Climate change makes uncertain future environmental change a particularly pertinent aspect of temporal distance. So, many of the factors and processes shaping the community vulnerability context are distant – spatially, politically, temporally, and culturally – and therefore largely outside the direct sphere of influence of the community itself.

Figure 20 displays Mota Lava's NVD. It displays a particular 'event-centred' manifestation of vulnerability – vulnerability to food insecurity following a tropical cyclone (discussed in Chapter Five). As is discussed in Chapter Five, cyclone-related food insecurity was, overwhelmingly, the most frequently discussed aspect of climate related vulnerability in Mota Lava. Cyclone Funa (January 2008) revealed this to be a significant problem. Many of the distant and indirect causes of food insecurity shape other cyclone-centred manifestations (such as insecure housing) as well as other climate stressor-centred manifestations (such as drought-related food insecurity). As stated by Lavell (2004: 82), "both disaster and everyday risk have similar origins". Cyclone-

centred insecure housing and drought-centred food insecurity are referred to throughout to enrich the discussion of distant causes[42].

The *direct* causes of vulnerability contained in the blue circle are a loss of traditional vulnerability reduction tools. The specifics of these are discussed in Chapter Five. The yellow circle contains examples of the *indirect* social processes underpinning this reduction in the adaptive toolkit. These are priority concerns in the community regardless of climate stress as they underlie most other community problems. These are the focus of this chapter. Outside the circles are the *distant* causes of these local problems. These are socio-economic, cultural, historical, and political in nature, operating at national, regional and global scales. The community have little power to influence these processes. Together, these indirect and distant processes are breaking down the social apparatus that sustains an effective traditional adaptive toolbox, whilst at the same time limiting the availability and effectiveness of contemporary tools.

[42] It is likely that in some community contexts it would be necesessary to develop discrete NVD's for different aspects of vulenrability to a certain climate stressor, and/or for different climate stressors. However, in this case study, the degree of overlap between the factors and processes shaping different manifestations of vulnerability was such that this is unnesessary.

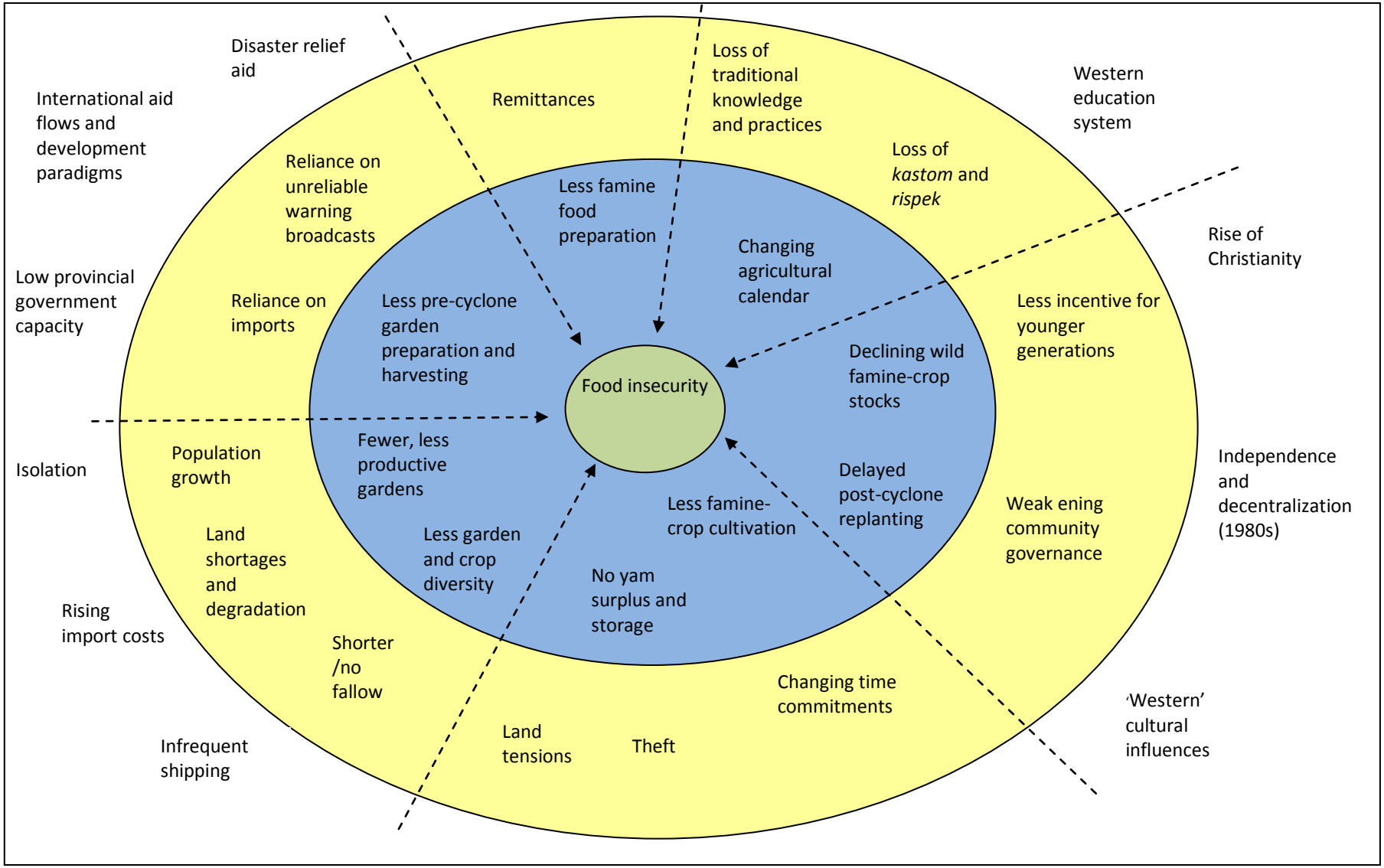

Figure 10 Mota Lava's NVD. This figure shows an NVD for Mota Lava. In this figure, the basic framework shown in Figure 14 above is populated with factors and processes specific to Mota Lava's vulnerability to food insecurity in the context of tropical cyclones. Importantly, the arrows do not specify specific relationships between the factors and processes contained within each layer. Rather, each layer represents multiple and interacting factors and processes forming a context from which vulnerability to cyclones arises. The arrows are intended only to indicate the direction of influence – from non-local to local.

4.2.2 Social change and vulnerability

The indirect factors and processes shaping vulnerability are largely a product of rapid social change, driven by distant processes. By social change, I mean the broad range of 'human' factors that affect sensitivity and adaptive capacity, as opposed to biophysical factors influencing exposure. Social change therefore encompasses social, cultural, economic, and political factors and processes.

Participants analysed social change in considerable depth in *storian*. This could have been due to the recent cyclone and obvious reduced capacity to cope than in times past (see Chapter Five). The implications of 'change' (particularly the negative implications) and the ways in which this relates to 'livelihood stability', 'vulnerability' and 'resilience'(although obviously not in this terminology) were perhaps at the forefront of people's minds because of this event.

Social change has taken away many of the traditional tools at the foundation of resilience to environmental uncertainty. The outcome is that the ability to effectively deal with climate stress events or situations that may occur is lessened. It is important to emphasise that social change may also have beneficial outcomes for dealing with climate stress. However, in *storian*, participants identified social change as being the primary cause of increasing vulnerability. As a result of social change, the activities, processes and systems that reduce risks posed by climate variability and extremes are less woven into the fabric of everyday life and livelihoods than in the recent past.

In the past, everyday life and livelihoods were constructed and maintained in ways that accounted for climate stress based on generations of experience of living with environmental uncertainty. This was not necessarily purposeful or conscious, but merely part of the way of doing things; yearly, monthly and daily. Participants felt that this is largely no longer the case, meaning that dealing with climate stress is less based on self-sufficiency and more uncertain. The reasons are embedded in processes of rapid colonial and postcolonial social change.

Aspects of social change discussed by participants fall into three broad themes discussed in the remainder of this chapter: 1) general socio-cultural change 2) changes in agricultural practices, and 3) growing import dependency and limited access to goods and services. I reiterate that the majority of these aspects were discussed by participants as priority concerns in the community, irrespective of climate stress. Although I separate these aspects for ease of reading, in reality they are tightly interwoven.

4.3 Socio-cultural change

This was the strongest theme that emerged from *storian* in Mota Lava. By socio-cultural change, I mean overarching changes in the social and cultural fabric of the community, including: knowledge, worldview, norms, values, belief systems, traditions, social relations and social organisation. Socio-cultural change alters the social apparatus and livelihood systems holding traditional vulnerability reduction tools in place. In basic terms, this is because traditional vulnerability reduction tools were/are embedded in socio-cultural traditional knowledge, worldviews and values shaping livelihood systems. As identified in the traditional ecological knowledge (TEK) literature, specific traditional environmental management practices arise from a knowledge-practice-belief complex (Berkes, 1999; in Berkes et al., 2000). As knowledge, beliefs, values and worldviews change on Mota Lava, so too does the social and cultural internalisation of vulnerability reduction behaviour (in particular, see Chapter Five, Section 5.4). Vulnerability reduction is becoming increasingly separate from general livelihood activities.

The changing social apparatus of vulnerability reduction has important implications for adaptation to increasing environmental uncertainty with climate change. Participants specified that socio-cultural change is reducing the ability to apply, accumulate, transmit and adapt traditional knowledge and practices relating to dealing with environmental uncertainty. Socio-cultural change therefore, is causing many traditional tools (outlined in Chapter Five) to be lost

from the adaptive toolbox. The outcome is that the community feel less self-sufficient in adapting to environmental uncertainty and more dependent upon distant forms of assistance over which they have little control. This is particularly important in terms of CBA, since CBA is largely about 'helping people to help themselves'.

Participants linked the majority of identified problems and concerns – both climate-related and 'non-climate'-related – to processes of rapid socio-cultural change in the community, particularly over the last 100 to 150 years. Most *storian* led by – particularly, albeit not exclusively – older participants contained a considerable element of comparing the contemporary situation to the *"taem bifo"* when discussing concerns and most emphasised the significance and rapidity of changes. Many identified that changing cultural values were at the root of most problems in the community.

Participants emphasised two broad foundational aspects of changes to the social apparatus of vulnerability reduction: changes in *kastom* (custom/traditional culture) and changes in *rispek* (respect/traditional social relations). These are broad and pervasive socio-cultural changes that affect all aspects of daily life and livelihoods, regardless of climate stress. The most problematic aspects of these changes in relation to traditional vulnerability reduction are:

- Changing structures of learning and knowledge dissemination.
- Changing worldviews and cultural values.
- Changing leadership institutions.

The broad features of changes to *kastom* and *rispek* are discussed below in turn, although socio-cultural change is a holistic process and the separation of these concepts is for clarity of reading.

4.3.1 Loss of *kastom*

In *storian,* 'loss of *kastom*' was discussed in reference to almost all aspects of social change[43]. Due to space limitations I restrict my discussion in this chapter to aspects of loss of *kastom* that participants identified as related (directly and indirectly) to dealing with climate stress – changes in particular *kastom* knowledge, values and ethics related to the adaptive toolkit. Overall changes in *kastom* underwrite these specific changes.

This thesis does not presume to make the distinction between what is, and what is not, '*kastom*' in the context of daily life and livelihoods. I have purposefully left the meaning of *kastom* as fluid and indefinite – it can mean 'knowledge', 'things', 'values', and a holistic 'way of being and behaving' (*fasin,* in *Bislama*). *Kastom* – the *Bislama* word – does not have the same meaning as its direct English translation, 'custom'. English concepts closer to its meaning are 'culture', tradition and 'traditional knowledge'. According to MacClancy (2002: 20):

> *Kastom.* . . is a whole way of life that dictates almost all of one's actions and provides its own particular interpretation for almost everything that happens. It is complete unto itself.

Reganvanu (2005) (perhaps the most authoritative source on the meaning of *kastom*) uses "custom" as a concept interchangeable with ni-Vanuatu "traditional culture". This is generally consistent with the contexts in which participants used the term *kastom*. Loss of *kastom* was frequently used to refer to holistic changes in the way of doing things. To reflect local usage, I have use the phrase 'loss of *kastom*' here, but this could easily be exchanged with 'changing way of life' or indeed 'social change'.

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[43] It should be noted that '*kastom*' may have become reified over time and that therefore, a "loss of *kastom*" may have become a 'catch-cause' of all contemporary prolbems. This is discussed in Chapter Six (Section 6.2.2.1).

The quotes in Table 11 below illustrate the range of contexts in which participants referred to *'kastom'*.

Table 11 Different uses of *"kastom"*

Things	*kastom* food is yam, island taro, one kind of banana. Manioc is not *kastom* food. *Kastom* bucket is made from a pumpkin-like fruit. When its ripe you scoop out the seeds and dry it. Ok, then, you put water inside. *Kastom* way of carrying water.
Ceremony/ritual	. . . if you want a piece of land you have to make a *kastom* for it. This means you have to pay with a pig, a mat or shell money.
Knowledge	*Kastom* belonging to us says that when a type of seabird comes to land, a cyclone will come. *Kastom* knowledge/know-how says that when the wild cane swells, ok, it's time to plant.
Skill	. . . *kastom* way of making a house – you have to tie a special kind of knot with a *kastom* vine.
Practice	Before, there were *kastom* months when you would plant the garden. All the old people before, they had a system like a calendar for the garden. A *kastom* calendar.
Values	In our *kastom* – my father told me – our *kastom* says that when you are a young man, you have to make a garden before your wife comes. In *kastom*, you thought about the future. In everything you do today, you do something to prepare for the future so you're safe. That was *kastom*. Now it's different.
Social institutions	*Kastom* chief was like a prime minister! It use to depend upon the *suqe* – that was the *kastom* system of how you became like a chief.
Social mores	In our *kastom,* it was forbidden for a child to say the name of his father.

I recognise that culture, traditional knowledge and therefore *kastom* is not a static phenomenon. Rather it evolves and adapts with changing situations. In

storian however, participants overwhelming referred (directly or indirectly) to *kastom* as something that is being *lost*, rather than something that is *changing* in a positive way. *Kastom* was often referenced alongside its 'nemeses' – 'money' and 'whiteman', indicating a 'way of life' that is under threat. For instance, Thomas, a community leader stated:

> …If Uncle here wants to make a *kastom* life again, who will cut copra to pay the school fees? You can't pay the school fees with island (traditional) money! You have to pay with white man money. White man money came from the copra [industry]. That's why we lost *kastom*! This island makes *kastom* but it's only the dregs of *kastom*. It's lies! People that make *kastom* – yam, *wovile*, pig, kava – you need all of these things! Island money. But you can't work for all of these things now because now, it's whiteman style. Now it's sugar, milk, coffee, tinned fish, school fee. *Kastom* is finished now.

In this *storian* – and many others like it – *kastom* is expressed as the antithesis of the culture of 'white man' (Western) and as a holistic 'way of life' that is being lost. In accordance with local perceptions, in the proceeding sections, 'loss of *kastom*' most frequently refers to particular *traditional ways of doing things* that are declining in prevalence in a contemporary situation.

The reasons for a loss of *kastom* are many and complex. Historically, colonialism and the missionary era involved a purposeful and at times violent dismantling of *kastom* (MacClancy, 2002; Regenvanu, 2005). As is discussed in the next section, the (neo-colonial) formal education system plays a significant role in the on-going declining reverence for *kastom* (source: local participants; Regenvanu, 2005). Historical and contemporary integration into a capitalist economic system plays a significant role. With the rapid erosion of the *suqe*[44], Mota Lava's *kastom*

[44] The *suqe* system was purposefully broken down by early missionaries in the Banks Islands (MacClancy, 2002)

economic and leadership system, the nature of Mota Lava's external economic relations have changed from being (mostly) within the Banks and Torres islands, to being further outside this immediate sphere of control (Campbell, 1985).

Participants identified significant friction between the underpinning values of *kastom* and underpinning values of capitalism, as Mota Lava becomes increasingly integrated into the market economy. To simplify, participants attributed collectivist values to *kastom* and individualist values to capitalism. Many (including younger participants themselves) referred to younger generations as valuing "*laef blong mani"* ("life belonging to money") rather than *"laef blong kastom*" ("life belonging to *kastom*"). This rather dichotomous view was often given as a reason for the changing value systems of younger people – capitalist/Western and *kastom* values are consciously viewed as incompatible. The way participants framed this problem is that (and this is my interpretation) their socio-economic system is in 'limbo' half way between traditional and cash, and achieving neither particularly well. This was articulated by Michael, an elderly participant:

> The world today is different to before, to the life belonging to my grandparents. Today we have come inside money – kerosene, sugar, tinned fish, school fee. Today everything is hard because we rely on outside. Today, plenty of children to school but why? They don't earn money when they come out because there are no jobs and no copra export. Some go to Vila and get office jobs – that's what school is there for. But most go and then come back to the island empty handed. Then they lay around – that isn't *kastom*. They don't know *kastom* and they want the things belonging to money. They can't look after themselves – they rely on little bits of money here and there. This is not a happy life. It is a hard life.

It is important to emphasise however, that participants did not generally think that going back to an entirely 'old' way of life was the best way forward. Rather,

their major concern was that they felt unable to maintain an acceptable continuity of *kastom* identity, values, life and livelihoods through change. This was a particular concern among younger participants. Younger participants especially, emphasised the need to find ways to keep hold of, and adapt, important foundational aspects of *kastom* knowledge, values, and worldviews integral to their identity, their livelihood security and their wellbeing, alongside a capitalist economic system.

These issues reflect the on-going wider development debate regarding "what constitutes development and for whom development exists" in the Pacific (Wallace, 2009: 528). Rural development policy in Vanuatu (as a product of national development direction in general) is based on economic advancement, based on a western capitalist frame rather than valuing and enhancing traditional *kastom* lifestyles (Regenvanu, 2005).

The aspects identified here are predominantly those that contribute to obvious problems in the community but it is important to emphasise that changes in culture are not all 'bad'. Regardless of language, regardless of whether *kastom* is actually being lost or is just evolving and regardless of whether this is negative, positive or both, the 'changing way of life' has a number of very real implications for sustainable livelihoods, as vulnerability reduction strategies become less culturally internalised, less integrated into general agricultural practice and more dependent upon outside knowledge and resources. Loss of *kastom* is thus a central influence on increasing vulnerability to climate stress and climate change. Specific features of a loss of *kastom* that reduce the sustainability and disaster resilience of livelihoods (and therefore food security) are discussed below in Section 4.4.1.

4.3.2 Loss of *rispek*

Declining (or changing) *rispek* is particularly concerning to local people. Like changing *kastom* more broadly, loss of *rispek* hinders the development, adaptation and application of traditional vulnerability reduction tools. Loss of

rispek is a major cause of declining traditional knowledge in which traditional tools are based. A loss of *rispek* also affects community leadership structures, impacting collective decision-making, action and cohesion. The outcomes of this for increasing vulnerability will become clearer once the reader reaches Chapter Five.

Participant references to *rispek* generally indicated a socially accepted way of being, of behaving, and of relating to others, based on a *kastom* cultural frame[45]. *Rispek* and *kastom* were frequently discussed side by side as *rispek* often refers to reverence for aspects of *kastom*. In *storian*, participants frequently used *rispek* in relation to social relationships and behaviour. Theoretically, systems of *rispek* can be applied to new and evolving cultural structures and phenomena (Lerche, 2008). Like *kastom* however, participants referred to *rispek* as a 'disappearing', rather than evolving, notion.

Declining *rispek* was most frequently attributed to younger generations, although it was also recognised as a community-wide issue[46]. In initial *storian*, changing *rispek* appeared rather inconsequential in the context of vulnerability to climate – in every society, the changing ways of young people are likely to cause consternation among older generations. However, as the research

[45] This conceptualisation of *rispek* was also found by Lerche (2008) who, in her research on difference and equality, also found that *rispek* is a core, foundational value of *kastom*, having common use in daily dialogue.

[46] Many of the problems related to 'loss of *kastom*' and 'loss of *rispek*' were blamed on the younger generation – for being 'lazy', for not being interested and for not engaging in learning about *kastom*. It is important to be mindful, however, that many participants also identified older people – and even elders – as having these attributes also. Reganvanu (2005) identifies that young people as a group often become the 'scapegoat' for increasing social problems, particularly by chiefs involved in policy at the national level, and their particular interpretations of *kastom* which are tied up in their bid to gain power at a national scale, often at the expense of groups such as youth and women.

progressed and *storian* became more in-depth, it became evident that this issue had strong links to vulnerability to climate change as it was a key driver of the loss of traditional tools through declining traditional knowledge dissemination.

Loss of *rispek* is changing traditional structures of education and knowledge dissemination in the community, decreasing intergenerational communication. Education was traditionally based on *storian* within the family and on 'learning by doing'. Many participants recalled the way they had learned *kastom* – through the stories their parents and grandparents had told them and through joining in livelihood activities from a young age. Learning *kastom* knowledge and skills is an experiential process. Many participants voiced concern that young people no longer "listened" and followed the "teachings" of their parents and other older family members and that they had little interest in *kastom*[47]. Participants were concerned that declining *rispek* is preventing *kastom* values and knowledge systems from being instilled from generation to generation. 'Home-based' learning is a fundamental medium for the dissemination of *kastom* knowledge and values. Sophia explained:

> Before, our fathers and mothers would tell us that we had to respect the words of the old people. For example, when your father and mother told you should go work in the garden – you had to go work in the garden! Now it's different.
>
> *How is it different now?*
>
> Now, the father and mother and grandparents try to teach the young people but they don't listen. They don't have *rispek*. They just hang around and play cards – they're disobedient! Lots of young people hear the teachings of the parents but they don't take it seriously,

[47] By 'parents' I include all kin of an individual that play a role in his or her upbringing and education, particularly his/her mother's oldest brother who, in *kastom,* plays a more significant role than the biological father.

> most don't act on the teaching. Some listen – some take on the knowledge, but most don't.

A significant driver of a loss of *rispek* emphasised by participants is the formal education system, based on a colonial model and Western knowledge and epistemology. Participants – both young and old – emphasised that this Western education system is devaluing *kastom* and *kastom* knowledge. Participants voiced concern that "*ejukatin blong laef*" (life education) that sustains *kastom* knowledge systems and livelihoods was lacking in the community. For example, Peter asked:

> … what does the government encourage? All the teachers encourage education to increase, but it increases in what way? Because the children come back from school with a different attitude. Now, they don't want to learn from their parents. They don't think their parents are wise because they have *kastom* wisdom and young people don't value *kastom*. They think the teachers are wise. But the teachers are wise with what? Wise with whiteman [Western] knowledge only. That's ok, but without *kastom* – stealing, fighting, no working together, no *rispek*! I ask you – what do they learn at school?!

In short, most participants believed that younger generations are losing reverence for traditional values that are fundamental to sustainable agricultural livelihoods. This is largely because of changing *rispek* for parents and elders among younger people that inhibits successful traditional "*ejukasin blong laef*" structures and institutions. Formal education emphasises 'Western' knowledge and epistemology, thus (inadvertently) degrading *kastom* knowledge and epistemology in which traditional vulnerability reduction tools are based. Since older generations hold less Western knowledge than younger generations, younger people are less inclined to *rispek* their teachings and knowledge. The communication gap between older and younger generations is widening because of a loss of *rispek* (see also, Ford et al., 2007).

Parallels between traditional knowledge loss in Vanuatu and the Canadian Arctic

The factors shaping a loss of traditional knowledge on Mota Lava are similar in many ways to erosion of traditional knowledge in Inuit communities in the Canadian territory of Nunavut. An erosion of knowledge and skills important to adaptive capacity has been documented among younger generations of Inuit throughout the Canadian Arctic. These knowledge and skills are based on a broader social apparatus that is changing. Similar to the situation on Mota Lava, although subsistence activities remain an important part of younger people's lives, there is a marked decrease in interest and commitment to harvesting activities. The factors driving this are related to formal, Western education requirements introduced during the 1970's and 1980's. These requirements reduce time available to participate in subsistence activities; segregate older and younger generations; and shift social norms. Ford et al. (2007) contend that young Inuit are locked into a spiral of traditional knowledge decline as the opportunities and incentives to learn experientially via elders, are lessened.

Box 5 Causes of traditional knowledge loss in the Canadian Arctic (from Ford et al., 2007)

As is also identified by Ford et al. (2007) in the context of the Canadian Arctic, reduced knowledge sharing between older and younger generations on Mota Lava reduces the ability to adapt traditional knowledge and practices to climate changed (and socially changed) conditions. Box 6 outlines the parallels in this regard. Elders act as "institutional memory" (Ford et al., 2007: 155) – as repository of accumulated knowledge and experience. Reduced maintenance and transmission of this traditional knowledge between generations means that flexibility to adapt coping strategies to changed conditions is reduced. Specific *kastom* knowledge and skills are being lost – for example, how to prepare particular famine foods. Also however, more pervasive value and ethical systems are being lost – for example, long term planning that sustainable and disaster resilient agriculture is dependent upon. As is also found by Ford et al. (2007), changing systems of *rispek* are reducing intergenerational contact, meaning younger generations are increasingly vulnerable to environmental uncertainty.

Similar concerns related to *rispek* for community leaders. Simon, a younger participant (born around 1970) explained that he had noticed a distinct change in *rispek* for leaders since he was a child:

> Before, we had chiefs that took things seriously – that looked after the people in the village. We worked together well and we listened well to the talk of the chief. Everyone had a lot of *rispek* for the chief. But when I was growing up, the *rispek* was lost. Now I'm a bit older, I can see that the rispek that we had before – the young people today have lost. Before, when I was child, there was no theft, no *strong hed*. Before, we listened to the teachings of the chiefs and the teachings of the parents. Now it's different.

Leadership and governance in Mota Lava (and indeed Vanuatu as a whole) is a complex and multifaceted issue. In a nutshell, *rispek* was the foundational value of the traditional leadership[48] system which was tied into the *suqe* (graded society institution), and a lesser extent *tamate* (secret society) (Codrington, 1891; Campbell, 1985). This system no longer exists to any politically functional degree. After the missionaries took to systematically dismantling the *suqe,* (by the 1920's) the nature of leadership changed drastically to one of 'democratically' elected 'chiefs' (every two years), with a raft of associated issues (source: local participants). As older participants put it, these days there's little to

[48] I struggle to find a Western concept that accurately describes the *kastom* system of social organisation and hierarchy in Mota Lava (and throughout most of Vanuatu) – 'leadership' and 'leader' does not sit particularly comfortably, although is closer than 'chieftainship' and 'chief'. It is difficult to ascertain if highly respected people (who in Mota Lava earned their status primarily through voluntary achievement and character via the *suqe* graded system, rather than solely kinship or inheritance) in a community were actually 'leaders' in the western sense of the word, although they had decision making power. It was more that the social system of becoming a 'big man' provided social organisation and a mechanism for social control, as this was mostly what life and livelihoods were structured around. Fazey et al. (2010) (in the context of the Solomon Islands) also recognise that elected chiefs have less power relative to 'big men'.

rispek (in the ni-Vanuatu sense of the word) as 'chiefs' (as they're now called) have to do little in a *kastom* sense to demonstrate commitment to the role.

Loss of *rispek* for leadership is not merely a product of the erosion of the *suqe* system (of which younger generations appear to have little detailed knowledge or appreciation for) – changing values and education systems again play a major role. In a *storian* regarding passing on *kastom* knowledge, Paul explained:

> You see, life today, the young people don't want to hear the old people. They don't have interest. Today, when a chief talks about *kastom*, they [young people] say "hey, your time has passed already".

This indicates that although leadership itself is obviously beset with problems, changing value systems also drives declining *rispek* for leaders and again, this is likely influenced by the changing nature of education. Berger and Luckman (1966) (cited in Allen, 1984: 36) identify that:

> …leaders are constantly threatened by the possibility that their cultural definitions of reality, their criteria of excellence and achievement, may lose popularity and hence legitimacy in favour of the growing popularity of either an entirely new definition or a definition that had previously been of a purely marginal kind.

A process of this form can be said to have occurred in Mota Lava. Over time, Christianity, the labour trade, market integration and 'capitalism', colonisation, de-colonisation and formal education are some of the prominent factors that have influenced this process of cultural change.

Loss of *rispek* for leaders is significant in the context of CBA in two major ways. Firstly, it reduces community cooperation, collective action capacity and cohesion. Without a strong and cohesive community decision making structure, it is difficult for the community to work together and come up with solutions to their own self-identified problems. This is particularly the case with problems relating to common property resource use, for example, land management to

address gardening land shortages (see Section 4.4.2). Ford et al. (2007) notes that collective discussion of changing climatic conditions is important to the successful adaptation of traditional risk reduction practices. Similarly, Fazey et al. (2010: 716) emphasise that "communicative, flexible institutions that encourage learning are essential for providing capacity to manage vulnerability". Participants noted a decline in effectiveness of community projects requiring a collective effort, for example, clearing old and dangerous trees from the village area to reduce cyclone risk. Few community members will contribute to such initiatives, particularly if there was no direct benefit for themselves.

Secondly, loss of *rispek* for leaders reduces effective governance and 'policing', reducing the effectiveness of 'rules' for social regulation. For example, management plans for community drinking water use repeatedly fail because individuals do not respect the rules put in place by chiefs. *Tabu* (taboos/restrictions) systems of traditional natural resource management now seldom work because harvesting rules traditionally enforced by chiefs are not respected.

4.4 Social change and agricultural practices

Social and socio-cultural change on Mota Lava majorly influences changing subsistence livelihoods, which, in turn, affects traditional vulnerability reduction tools embedded within these. Many traditional tools were/are an 'incidental' part of 'normal' agricultural practices. Therefore, changes to general agricultural practices are a major cause of decreasing food security – both in 'normal' times, and during periods of climate stress. This is a priority concern in the community. In many respects, agriculture is becoming less disaster resilient. The features of this are outlined in detail in Chapter Five, Section 5.5.

Briefly, the major agricultural changes affecting food security can be summarised as a shift towards fewer, smaller, less productive and less diverse (in terms of garden type and spatial location) subsistence gardens per household than in the *taem bifo*. There is less flexibility in resource use – a key strategy in risk reduction

(see also Ford et al., 2007). The volume, diversity and constancy of island-based food supply has reduced. This means food security is less certain than in the *taem bifo* – particularly during periods of climate stress –as the community is now reliant on imports to make up the deficits in local production.

It is important to bear in mind that changes to agriculture should not be assumed to be automatically negative. Adapting agricultural practices to suit changes in society makes rational sense, particularly given that old practices were highly labour intensive – as explained by Rose:

> Today, we don't follow the system belonging to the old people before. We make our own systems now that are easier – the old systems were hard.

Certain features of contemporary agriculture however, make island-based food production highly susceptible to damages from climate stress. In the absence of reliable external resource flows, this may be an unacceptable risk.

The factors and processes identified by participants as shaping these changes fall into two general (and overlapping) categories: those arising from socio-cultural change, and; and those arising from changes in population and land use patterns. These two categories are not mutually exclusive. I examine these in turn below.

4.4.1 Socio-cultural change and agriculture

This section examines three major themes related to changes in *kastom* and *rispek* identified by participants as influencing these agricultural changes: theft, 'laziness' and a lack of planning for the future. These are value-related drivers of agricultural change. Overall, participants noted increasingly less commitment and interest in sustainable gardening practices among younger generations.

4.4.1.1 Theft ('stil')

Theft – or '*stil*' – within the community is a priority concern. Increasing *stil* is one aspect of declining *rispek*. Participants emphasised that the current prominence

of theft in the community marks a significant departure from *kastom,* denoting changes in social relations, values, codes of behaviour and governance. Theft was discussed most frequently in the context of food security and agriculture; stealing food crops from each other's gardens is the most prevalent form[49]. This increases vulnerability to food insecurity because it reduces the productivity and diversity of gardens.

Theft decreases the quantity of crops a household can consume per unit of land, meaning pressure on limited gardening land increases. John explained:

> Before we had one garden but now I look, I say, one garden isn't enough. There's a reason for that. Now, food doesn't just belong to me. When I go to harvest the garden, we have *stil*. If there wasn't stealing, I'd have plenty of food. Now, to get the same amount of crops, we should make more gardens. Before – no *stil.* Because we had *rispek*.

Stil reduces the diversity of garden types and locations. Specifically, it reduces the prevalence of: established gardens remote from the villages, bush gardens, and 'wild yam' areas. Below in Section 4.4.2.2 I outline in detail, the changing spatial nature of land use for agriculture. Briefly, gardening is now far more concentrated on land at the point (close to the villages) than in the *taem bifo*[50]. Land once used for established gardens at Valua, and at sites in the 'middle' of

[49] It was unclear from *storian* whether '*stil*' always indicated errant behaviour. Some participants indicated that *stil* may mean family members taking crops that are planted on family land but that are not traditionally within their rights to take. Some participants indicated that *stil* was 'non-aggressive' – amicable, but a problem nonetheless. Because the land allocation system on Mota Lava is increasingly unclear, individuals might take crops that would not be theirs to take under the traditional rules of *kastom* and *rispek*.

[50] Half way between the populated peninsula and Valua on both northern and southern coasts.

the island is no longer intensively gardened. Bush gardens – low maintenance gardens located in the bush at higher elevations – are now seldom utilized.

A recent increase in *stil* is one of the reasons for this reduced diversity in garden location and type. Gardens located at Valua and in the 'middle' are a frequent target for *stil*. Given the travelling distance, these gardens are not visited as regularly as gardens at the point, making them easy targets. Bush gardens, also remote, are normally planted once or twice a year and then left to mature with little regular maintenance. They are also located in dense bush and are generally far apart. They are therefore also an easy target for *stil*. Participants explained that theft has increased to such a degree over the past couple of decades that many households and individuals no longer see much point in planting bush gardens. Bush gardens are particularly resilient to tropical cyclones and droughts and perform an important traditional vulnerability reduction function (see Section 5.5.2). The overall contribution of bush gardens to food security in the community has declined significantly. As discussed in Chapter Five, Cyclone Funa highlighted the problem of decreasing 'wild yam' stocks. Theft increased significantly following the cyclone as many households were unable to meet their own food consumption needs.

Participants frequently linked increases in theft to a lack of strong leadership institutions. A lack of 'policing' means that the consequences for stealing are few.

4.4.1.2 'Laez' ('Laziness')

'Laez', or 'Laziness' was discussed by participants as a key value change among younger generations. *Laez* generally referred to reduced incentive or motivation to engage in subsistence livelihood activities (e.g. see Box 7). As was also found by Ford et al. (2007) among Inuit communities, although subsistence activities remain important to younger generations on Mota Lava, shifts in social norms mean that there is less interest and motivation. Consequently, subsistence systems are less robust, sustainable and resilient, particularly in the context of

increasing environmental uncertainty. Declining *rispek* for a *kastom* work ethic – traditionally instilled by parents and leadership institutions – is a major contributing factor.

"***Yu mas plant evri dei" ("*you must plant every day")**

This was a foundational feature of *kastom* in the *taem bifo:*

> *kastom* says that you must plant every day – a tree, a cabbage, a banana. One thing every day. If you don't plant food in the ground on one day, if you waste one day, then some day that comes you will be short (Peter)

Working in the gardens dictated the daily schedule, taking precedence above most other activities. Most days, "You go to the garden at about 7 or 8 o'clock. You work until dark" (John)

This typifies the *kastom* work ethic and was necessary to fulfil subsistence, cultural and vulnerability reduction needs.

Box 6 "*Yu mas plant evri dei*": the *kastom* daily work ethic

This is important in the context of vulnerability as it significantly impacts the robustness of agriculture and other aspects of disaster risk reduction. As Rose stated:

> Before it was different, we had *rispek* and *kastom* was strong. Now people just walk about and don't do enough work to prepare. That's why today, we have problem with disaster.

The problem of *laez* is basically representative of changing values, marking a departure from a *kastom* work ethic (see Box 7).

In the *taem bifo* agriculture was structured largely around cushioning against future uncertainties and ensuring there was a fairly constant and diverse availability of crops. These *kastom* values have significantly declined throughout the community. Contemporarily, people generally spend less time working in the gardens than their parents and grandparents. The outcome is fewer gardens, fewer crops in gardens, less diversity in garden location and reductions in crop

quality, particularly among younger people[51]. *Laez* was frequently linked to the increasing consumption of imported food. In many ways there is contemporarily less need for the same level of labour as in the *taem bifo*, as (mainly) rice makes up the shortfalls. This comes with its own set of challenges, as outlined below.

Some participants attributed reduced labour inputs to increasing demands on time in the community, rather than 'laziness' per se. Many noted that contemporarily, households and individuals are expected to dedicate time to things that did not exist in the *taem bifo* such as church activities, economic activities, school, community work, and festivals. This leaves less time for subsistence activities. Campbell (1985: 119) identifies the establishment of the copra industry on Mota Lava (since the 1940s) to have had a significant impact on the allocation of time in agriculture. Copra production left less time available for subsistence gardening, thus driving changes in gardening systems. However, copra is now rarely processed on Mota Lava due to lack of shipping services since the 1980s. It may be that changes to gardening practices to accommodate reduced labour availability were established during the copra era and have persisted despite more labour time now being available. Participants frequently referred to current poor gardening practices as 'habit'. There are many factors at play, however, and this is largely conjecture on my part.

Most participants believed increasing time commitments to be merely an excuse for laziness or changing work ethic. Many people – particularly younger people –

[51] It is important to note that declining daily labour inputs to gardens is likely to also be influenced by changing crops. Contemporarily, people plant far less yam than in the past, instead substituting with the less labour intensive manioc, *kumala*, and non-traditional taro varieties. One major reason is the expansion of coconut plantations into established garden land in the mid 20th century. This degraded the soil, meaning yam (requiring high soil fertility) was largely replaced with manioc (source: local participants; Campbell, 1985). Yam is particularly labour intensive and requires regular work meaning that today there may be less *need* to engage in the same levels of daily levels as in the past.

are seldom engaged with other time commitments. Many emphasised that many commitments existed in the *taem bifo* as well – it is just that the nature of the commitments have changed. Social change comes with changes to daily time allocations as the nature of daily life and livelihoods change.

4.4.1.3 'Fuja luk luk' ('Looking to the future')

Many participants voiced concern about an increasing lack of planning for the future amongst younger generations. This closely tied into *laez* and decreased labour inputs, but refers to a longer time scale. Participants frequently cited a culture of 'proactivity' – in many aspects of life – as an important *kastom* value.

"Wan pikinini, wan karen" ("*one child, one garden*")

This phrase indicates a *kastom* ethic of proactively preparing for the future. It is foundational *kastom* value ensuring livelihood sustainability:

> Our *kastom* teaching says: when you are a young person, you make a garden of your own before you are married. When you have one child, you must have more – two gardens. When you have three children, you must have four gardens. So this is *kastom* that we lived with (Samuel)

Traditionally, it is *tabu* for a young man to marry until he has established a garden of his own and built a house. With each new child born, another garden was established. Planning land use for prospective children begins long before the children themselves arrived.

"Wan pikinini, wan garden" is essentially a mechanism for ensuring self sufficiency in food security. These practices ensured continued food security – given environmental uncertainty – and ensured that each child could self sufficiently meet their own prospective family's needs when the time came.

Box 7 "*Wan pikinini, wan karen":* the *kastom* long-term work ethic

David explained that:

> Before, they had a lot of knowledge about how to ensure the safe futures of the children. But now, people don't think about their future. I don't know why it's happening, I think it's because, today

> the teaching is different to before. Today, no *rispek*. Talk belonging to my father and mother was that they planted for me, afterwards, I plant for my children. This is why today, cyclone comes, but plenty of people are not ready.

Many linked this issue to declining *rispek* for parents and their knowledge, and declining *rispek* for *kastom* itself. Lack of planning for the future was discussed mostly in the context of livelihoods and land use. Increasingly, families do not have enough gardens to support their subsistence requirement which means that they are particularly vulnerable to food insecurity in times of climate stress. Many younger people and their families rely on their parents' gardens to meet their subsistence needs.

The apparent erosion of the *kastom* value of planning for the future pervades many aspects of life and outcomes are not restricted to subsistence gardening. Many participants also noted that many younger families did not plant *natangura* (sago palm, a material fundamental to traditional house building and a traditional famine food) of their own, instead relying on trees planted by their parents. Participants believed that if a severe cyclone (such as Cyclone Wendy in 1972, which destroyed all houses in the villages) occurred today, there would not be enough *natangura* to meet rebuilding needs. Participants of all ages identified this as a fairly recent problem; most middle-aged to older participants stated that they had followed *kastom*, but their children had not.

It is likely that, like much of *kastom*, the strong value of planning for the future was underpinned by the *suqe* social institution – there were particular kinship obligations to give boys a 'head start' in the graded system[52], which required extensive proactive garden preparation.

[52] There was an element of hereditary insofar as 'big men's' sons had more resources with which to become 'big men' themselves.

Many older participants were concerned about the future as the population will increase. The trend is towards too many families relying on too few gardens. If the current trend continues, the community will lose the capability for self-sufficiency in food security and instead rely too heavily upon imports (see Section 4. 5 below). James noted:

> Because me, I have four boys. They make no gardens yet! I worry, if you have four boys you will have four women coming inside. You look – it's not right. They don't plant enough in their garden – no food now! When you're married it's too late now. Now you have to steal! You have to pay for rice, but you can't rely on that. Problem!

Again, there are obviously other factors influencing this change in values – one of which is population growth.

4.4.2 Population growth and changes in land use patterns

Population growth and socio-cultural change is increasing pressure on highly utilized, established garden areas at the point. The population is growing. At the same time, shifts in social norms and values (in particular, *stil* and *laez*) mean that established garden land further way from the locus of settlement is underutilized. The land area used for subsistence agriculture is getting smaller. The outcome of this trend is fewer gardens, less productive gardens and reduced diversity of garden type and location. This increases vulnerability to climate stress in ways outlined in Chapter Five, Section 5.5. Reduced community leadership capacity is hindering the ability to address this community resource management issue.

4.4.2.1 Population growth

Is the reduction in '*wan pikinini, wan karen'* due to changing *kastom* values or to a shortage of available land with a growing population? Most participants agreed that a high use rate of established garden land areas is reducing food security. However, I encountered a range of opinions as to why this was

occurring. Some participants attributed reductions in garden number and size per household to an increasing population – the population is getting bigger, but the established gardening land is not, leaving less available space for gardens. Others believed that this was a common 'excuse' for laziness and shifting social norms – there is plenty of land available, but people are unmotivated to farm it sustainably.

Population change with respect to agricultural change, land use change and natural disaster in Mota Lava is examined at length by Campbell (1985). The following builds off this work, portraying the variable ways in which participants in my research framed the interface between changing agriculture, changing population and changing *kastom.*

Figure 21 shows total population change on Mota Lava since 1892, when the first recorded population estimate was made. Although it is impossible to know for certain what the population of Mota Lava was prior to European contact, Campbell (1985) estimates it as around 2000 people – slightly more than the estimated population in 2008. Participants in my research referred to *kastom* stories suggesting that the population of Mota Lava was higher than it is currently, prior to the arrival of the missionaries. This is important to note as participants stressed that agriculture was able to sustainably support this population before European contact. Campbell (1985) identifies that most of the prominent agricultural changes in Mota Lava (changes to gardening systems, and the introduction of cash crops) occurred at a time when population was at its lowest – around the 1940s.

The major agents of population change over time have been mortality and migration. Increased mortality occurred in response to disease after European contact (mid 1800s). A significant period of out-migration 1863-1911 was in response to the labour trade (Campbell, 1985).

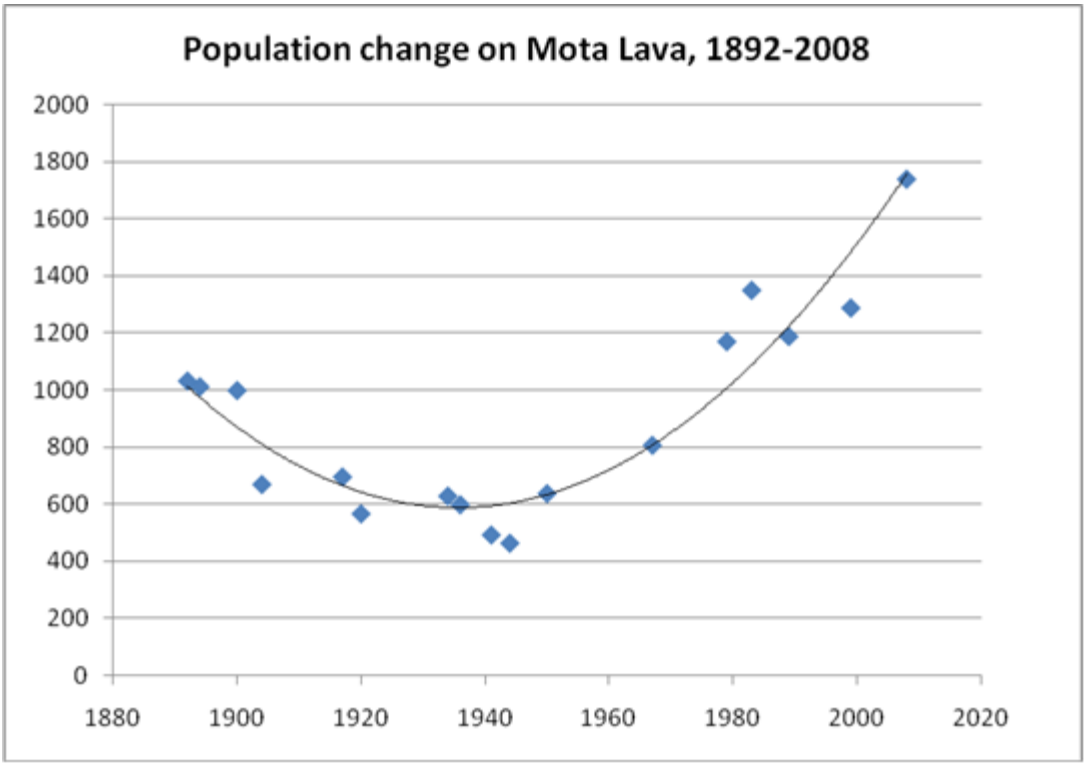

Figure 21 Population change on Mota Lava

Notes: Values 1892-1983 are sourced from Campbell (1985: 50 and 65). These are a combination of estimates from mission records, official census data and other sources. 1989 and 1999 values are from the censuses of population and housing (Government of Vanuatu, 1991; 2000). The 2008 value is an estimate taken from an unofficial community census conducted by members of the Mota Lava community in May 2008 for a water project.

As can be seen in Figure 21, the population of Mota Lava is growing. Based on an informal census conducted by community members in May 2008 and population census data from 1999, the current growth rate is 4.3% per annum, which is an extremely high rate (a doubling rate of 16.4 years)[53]. The fact that the population

[53] I stress that the 2008 total on which this rate is based came from an informal census, the method of data collection for which was unclear. Most importantly I am unable to ascertain if the total population figure produced by the informal census includes people living away from the island, which may significantly influence the rate as the formal census totals include residents of the island only. This is important to emphasise – the current growth rate may not be as extreme as it appears from this figure as there are many Mota Lava community members living away from the island. This is significantly higher than the national population growth rate of Vanuatu from 1999-2009, which is 2.3% per annum (Government of Vanuatu, 2009). Accordingly, this figure must be treated with caution.

is growing was universally accepted by participants – all agreed that population pressure and land availability was a significant issue with many repercussions on Mota Lava. However, the extent to which this accounts for agricultural change was an issue of much deliberation in *storian.*

Some participants believed that land currently available for gardening is not enough to support the growing population – hence trends towards smaller and fewer gardens per household. Participants in my research were concerned that land available for gardening would not be enough to sustain current rates of population growth. Some participants pointed out that this would be exacerbated as the residential village land expanded into the established gardening land – land shortage concerns apply to the village land as well as established gardening land.

One participant strongly believed that the reason people no longer produced a quantity and diversity of crops to cushion against climate stress and uncertainty was that there was simply no longer enough land. According to this participant the knowledge and incentive to engage in disaster resilient agricultural practices from the *taem bifo* – such as *wan pikinini, wan karen* – still exist, but are now rendered impossible by the population size[54]. However, the perspective voiced by this participant contrasted with that of the majority of participants reflected in John's statement:

> You come to make your research about disaster. I can tell you straight that on Mota Lava, the land doesn't grow, no, but at the same time, people do not work. We have enough space to plant food but we don't have man belonging to work. If people work, they have food. It is a problem that the land doesn't grow – but the number one problem is that people don't work. Before, people planted plenty

[54] It is worth noting that this participant is a previous government employee and thus had lived away from Mota Lava for many years.

of 'wild yam', plenty of food. When a cyclone came they didn't worry – because plenty of food was there, they were ok. Now it's different.

Population growth is coupled with an increasing concentration of agriculture on established gardening land at the point. This increasing concentration is because of socio-cultural change. This trend is not sustainable.

4.4.2.2 Changes in spatial land use

The increasing trend of households relying on too few crops is due primarily to *the underutilization of available land*, rather than lack of land *per se*. Older participants in particular, believed that although population growth clearly contributes to high land use rates (and subsequently smaller subsistence outputs per household), an equally important driver is a recent spatial concentration of gardening on the point, close to the locus of settlement. The reasons for this are socio-cultural. Many participants emphasized that plenty of land is available for expanded established gardens, but that shifts in social norms limit its utilization.

To recapitulate, most gardens are located on established, inherited gardening land of which there are three main areas – the 'point', the 'middle' and 'Valua' (see Chapter Three, Figure 8). Contemporarily, most gardens are concentrated on the point at the western end of the island surrounding the villages. Most households also maintain, or have maintained in the recent past, gardens at Valua at the eastern end and in the middle. However, few households now utilize these due to the time and effort required to travel there and back[55].

Campbell (1985) examines in-depth the factors that have changed agricultural land use systems in Mota Lava since European contact. To summarise his work, pressure on land – particularly at the point – has increased since contact due to:

[55] As with many of these assertions, this is an overall perceived trend expressed by the majority of participants. It does not necessarily apply to *all* households – during my time in Mota Lava I accompanied many families to their gardens in the middle and at Valua – many households *do* still maintain gardens away from the point.

a) a historical shift in population concentration from the eastern to western parts of the island (culminating around the 1940's), b) the introduction of coconut plantations (1940's) and c) the introduction of new crops (1940's), resulting in d) increasing rates of land use, particularly at the point, typified by reduced garden fallow. I identify two factors that further exacerbate the problems stemming from these historical processes in a contemporary situation: 1) changing *kastom* values that reduce incentives to use land at Valua and 'middle', and reduce incentives to clear land not recently established as gardens, and 2) an increasingly unclear land inheritance/allocation system that increases land use rates at point[56].

Participants identified that in the *taem bifo*, their parents would go to Valua and particular sites in the middle and stay for weeks at a time in bush houses whilst working on their gardens (this is also discussed by Campbell, 1985). This seldom happens contemporarily – people go and come back in one day, meaning that labour inputs to gardens in these locations have been drastically reduced and land is not used as intensively.

Campbell (1985: 199) indicates an "eastern movement in the locus of gardens" in the early 1980's in response to increased demands on land at the point[57]. My

[56] Because of the sensitivities associated with land rights in Vanuatu I have chosen not to expand on this point in this research. To summarise the major issue, unclear land ownership results in extended family members laying claim to pieces of land as soon as it is left to fallow. The outcome is that fallow periods are often reduced to nothing and soil is quickly degrading.

[57] Ten years later, Tapari (1993) reinforced this finding, identifying via questionnaire survey that 81% of Nerenigman residents farmed land on the point, 74% at Valua and 60% in the middle, from which he concludes that land at all three locations was used intensively by the community. This runs somewhat contradictory to my findings via *storian*, that these areas are becoming *less* utlised. It is possible that the situation has changed over the past 17 years with increasing social issues. These apparent contradictions are likely to also stem from different methodological approaches.

research indicates that this movement has slowed considerably. This may be because of reduced access to transport: Campbell (1985) notes that the eastward movement increases fuel expenses, indicating that households made use of motorised transport in the early 1980's. Although the island currently has one truck, access to fuel is sporadic due to shipping infrequency (see Section 4.5.2.1 below) and fuel is now too expensive for most households to afford. The extensive hours and energy required to cover the 14km. on foot is a significant disincentive to maintain gardens at Valua.

The utilization of bush garden areas has also declined, taking this source of food production (an important 'cushion') out of the gardening system (see Chapter Five, Section 5.5.2). I have already outlined the contribution that *stil* makes to this trend. In addition, many people do not make bush gardens because of the labour involved. Bush gardens are located '*antap*' (at higher elevations) in the middle and near Valua. They are generally further inland than the established garden areas and located in secondary forest on slopes and hillsides. They are generally not accessed by established pathways. Accessing them requires a full and intensive day of labour. I asked Samuel:

> *If there isn't enough land at the point, why don't people make bush gardens anymore?*
>
> I think it's because they are lazy. Bush gardens are far away – it takes a whole day to go there. Also, it's hard work at the start because you have to cut big trees because the land rests for a long time. With gardens at the point, they hardly rest at all, you only have to cut the grass. Much easier. We have a large amount of land still – bush land – but many people are too lazy to go on top to use it.

Reviving bush gardens and more intensive gardening at Valua was often cited as a potential solution to the space and population growth issue, particularly following the food insecurity following Cyclone Funa (Chapter Five).

4.4.2.3 Changes in intensity of land use

In addition to fewer, smaller and less location-diverse gardens per household, existing gardens at the point are becoming less productive because of soil degradation. Again, this reduces the quantity of subsistence crops produced[58], increasing vulnerability to food insecurity. Participants voiced concern that the length of the fallow has shortened markedly – particularly over the last couple of decades.

Ideally, established garden land is returned to fallow for a number of years after stages of planting are complete, enabling dense vegetation to re-establish. Campbell (1985: 92) estimates traditional fallow length to be roughly eight to twelve years. Participants in my research estimated fallow (on the point) in the *taem bifo* to have been between five and ten years – enough time for dense secondary bush to grow back again. New gardens would be cut from this new bush. However, participant estimates of the current fallow length of gardens on the point were in the range zero to three years – significantly shorter than in the *taem bifo.*

Many participants in my research indicated that it is now common to not return land to fallow at all. Obviously, an increased concentration of land use at the point and population increase drives this change. In addition, Campbell (1985) identifies the introduction of non-traditional crops (particularly manioc) to contribute to a reduced fallow as these lengthen the phase of cultivation, adding an extra stage to successive plantings. I identify a further issue compounding these drivers: the system of land inheritance is becoming increasingly unclear, increasing the number of individuals laying claim to – and using – pieces of land. Peter explained the situation:

> If I let go [of the land], my brother will come inside. Now I don't have a garden! If I slacken my hand, cousins, children, uncles, nieces and

[58] Changes in the stages, methods and seasonality of planting also impact yield (Chapter Five).

> nephews, grandchildren – everyone, they will all come inside and I will lose my gardens! That's why I have to replant straight away.

This generally 'non-aggressive' land grabbing within family groups was one of the most frequently emphasised problems in *storian.* In a nutshell, people are reluctant to leave pieces of land to fallow in case kin (of which there are potentially a very large number) snap it up while it is 'unused'. Participants did not generally term this a 'land dispute' as such – under the current (as opposed to true *kastom*) inheritance system, kin can claim rights in one way or another. However, this is precisely the problem. Once kin have moved in, there is little the previous owner can do about it. Many participants were concerned that more aggressive land disputes would emerge within kin groups in the future. Changes to the system of land inheritance exacerbate the spatial problems as there are now far more individuals asserting claim over pieces of land than in the *taem bifo* – land that is already short.

The *kastom* system of land inheritance was complex and I will not go into detail here[59]. Briefly, established permanent gardening land at the point (as well as most gardening land in the middle and at Valua) is passed on to a child through his/her mother's brother, reflecting the mode of exogamous descent in the Banks islands. The child then has control over this piece of land owned by his/her

[59] Land rights is an important issue to consider in the context of CBA in Vanuatu, as the ability of people to provide for their own food security is largely determined by access to land. Following independence, land was returned to '*kastom'* ownership by the government – in policy. However, *kastom* ownership is based on traditional knowledge that has largely been lost. The land court system in Vanuatu is expensive and difficult for less wealthly and literate ni-Vanuatu families. Resultant land disputes are at the core of many community problems in Vanuatu. Legal disputes over land commonly impact community cohesion, leadership and collective action. Because of the extreme sensitivities surrounding land, I chose, as a non ni-Vanuatu, not to delve into this issue in my research. Although Mota Lava does not yet face significant legal disputes over land, land rights and inheritance was a topic that few participants wished to discuss in any depth.

kin for the duration of his/her life. In *kastom*, this is how the majority of established garden land is allocated. The common exception is when a man's biological children wish to lay claim to a piece of his land which they have occupied before his death. In this case the children must "make *kastom*" for this land. Making *kastom* involves a specific public ceremonial payment[60] to their biological father's brothers and 'rightful' heirs to the land (this being their 'cousins'), sometimes upon his death. Among other things, this payment formalises and clarifies the transaction[61]. Participants emphasised that in the *taem bifo*, the key to the success of the inheritance system was an extensive and intricate knowledge of: kinship membership or 'family tree'; the individual present and past owners of pieces of land; mode of inheritance of these (matrilineal or patrilineal), and; the boundaries of pieces of land themselves.

This knowledge – and *reverence* for this knowledge – is being lost and the system of inheritance is becoming less clear. In the *taem bifo*, individuals knew their extended family tree from birth and had extensive knowledge of the affiliations of others in the community. Participants linked this loss of knowledge to changing rispek and, in particular, changing structures of education in the community and increasing intergenerational communication gaps. This loss of knowledge has the following outcomes: 1) land inheritance is "*olbout*" ("all about"), meaning both biological children and 'nephews/nieces' can claim rights to a piece of land in the absence of making *kastom* and/or 2) the prevalence of making *kastom* is tailing off meaning that often old payments are not honoured, and 3) the ownership status of many bush garden and unused bush areas is unclear – there was little agreement amongst participants as to whether unused bush land was common property, or had owners. Many participants noted that

[60] Pigs, kava, yams, shell money and in more recent times, Western money.

[61] It was unclear, however, who the heirs to this land then are upon the childrens deaths – which moiety then has claim.

the current inheritance system is "*half-half*", meaning it is neither strictly matrilineal nor strictly patrilineal. The outcome is significantly more people laying claim to pieces of land and therefore, increasingly short fallow periods leading to soil degradation and reduced crop yield.

It is highly likely that missionary influence played a significant role in the early shift away from a *kastom* system and towards a patrilineal system: Allen (1984) contends that the absence of matrilineal institutions in 19th Century Europe rendered these 'primitive' in the eyes of early European colonists and this sentiment is, if implicitly, reflected in the works of Codrington (1891) and Rivers (1908)[62]. It is likely that the church encouraged a shift away from the exogamous moiety structure and towards a 'nuclear' family arrangement, mirroring that of the self-imagined 'highly civilised' and 'enlightened' West, thus impacting the *kastom* kinship system (Andrina Thomas, pers. comm., 16.09.2009).

To summarise Section 4.4, participants identified the following factors and processes as causing changes in agricultural practices: decreasing interest and motivation for subsistence activities; population growth; underutilization of available gardening land, and; an increasingly unclear land allocation system. These four factors converge to result in reduced resilience and sustainability of subsistence food production. Fewer households are currently able to meet their consumption needs from island-based food sources only. This is particularly the case during periods of climate stress. Vulnerability to food insecurity is increased in two main ways. Firstly, fewer subsistence crops are able to be produced per household because of fewer gardens, smaller gardens and soil degradation. Secondly, the diversity of garden location and type is reduced meaning the chance of all crops being destroyed by cyclone or drought is increased (see Chapter Five, Section 5.5). Solving these problems at the local level is hindered by reduced community leadership capacity. Addressing the challenges associated

[62] Early ethnographies of island Melanesia.

with agricultural change require a collective, community-wide response. Changes to subsistence agricultural practices mean that the community is becoming increasingly reliant on imports to meet household consumption needs.

4.5 Access to imports

With changing agricultural practices, imported food is an important component of food security in the contemporary situation on Mota Lava. Imported food fills the deficits in island food production resultant of changing agricultural practices. Importantly, consuming imported food is a fundamental contemporary vulnerability reduction tool during periods of climate stress. Non-local food consumption is becoming increasingly prominent in the adaptive toolbox as traditional food security tools decline (Chapter Five). However, access to imports is becoming less certain. Wider market forces and development challenges mean that the ability of Mota Lavans to access imported food – and the cash to pay for it – has worsened over time. Inadequate shipping links, low economic development capacity and global food price increases are the main features of this. Difficult and uncertain access to imports is a priority concern in the community irrespective of climate stress. In many ways, reliance on imports is increasing vulnerability, because access is shaped by distant factors and processes outside community control. The community is becoming less food secure – both in 'normal' times and (especially) during periods of climate stress.

The distant factors and processes influencing this situation are an important consideration in the context of CBA. Higher-scale development challenges are a key factor limiting adaptive capacity on Mota Lava. Can (and should) CBA be community-led and engender self-reliant adaptive solutions without addressing higher scale development challenges? This point is addressed in Chapter Six. Chapter Five, Section 5.4.2, outlines the consequences of import reliance following Cyclone Funa. The current section outlines: the reasons for increasing dependence on imports, and; factors shaping increasing unreliable access to imports – both physical and financial.

4.5.1 Imported food: dependence or preference?

Reliance on imports is both a cause and an outcome of changing agricultural practices. It is a cause because increasing consumption of imports further reduces incentives to ensure food security from island-based sources. It is an outcome because gardening practices have changed for other social reasons outlined above, *necessitating* consumption of imports to fill the gaps in production. The situation is self-perpetuating.

Dependence upon imported food is increasing, and has become particularly pronounced over the past two decades, according to participants. Increasing import dependence over time matches the growth of the market economy in the Banks Islands. Whilst the presence of imports has many positive aspects (such as preventing outright famine when climate stress reduces crop production) an entrenched demand is now not matched by reliable supply or by sufficient export earnings[63], resulting in many negative implications. Imported food or *kaekae blong waetman* is an important supplement to locally produced food. The average monthly household expenditure on food in the Torba province is 6358 Vatu[64] (this likely also includes purchases of locally produced food), this being 20% of total average household expenditure[65] (Government of Vanuatu, 2007a). This proportion is comparable to the total rural average monthly household expenditure on food across all six provinces, the national average

[63] In the contemporary situation, Mota Lava is more tied into the market economy than it has ever been, being highly reliant on cash to meet basic needs. The problem, however, is that because of market contraints, Mota Lava is no longer engaged in copra production and sale – previously the major export earner for the community (Campbell, 1985). As discussed in Section 4.5.3 below, most cash for purchasing imports now appears to come from remittances.

[64] USD $68.

[65] The total average monthly household expenditure for Torba is 32,009. It should be noted that this includes own account production, or the consumption of home-produced items (Government of Vanuatu, 2007a:48).

monthly expenditure on food for rural households being 19% of total expenditure.

Rice is the most important supplement to locally produced food[66]. Rice is now a staple component of most household diets – when available, a large quantity of rice is eaten with most meals. This significantly supplements locally produced carbohydrates such as yam, manioc, taro and breadfruit. A 'dependence' on rice as a large proportion of local diets was, in itself, frequently identified by participants as an issue due to nutrition concerns and the fact that is it not *kastom*. Importantly, this is also for financial reasons – it is difficult to meet other expenses, especially school fees, alongside food expenses. Tea and sugar are also important imported consumables, as are cabin biscuits, flour, dried noodles, tinned meat, tinned fish, salt, tobacco and various condiments such as soy sauce and margarine.

Many participants discussed the high consumption level of rice as a 'habit'[67]. It may be more accurate to term it a 'preference' than strictly a 'dependence' as such, although there is now little distinction between the two. Many participants indicated that on the whole, people did not appear to adjust consumption patterns, despite a recent drastic increase in the price of rice that is not matched by an increase in cash incomes. This may indicate that either rice preference is strong enough that households will re-adjust expenditure to accommodate it, or, for reasons discussed in previous sections, people have few other island-based options for meeting food requirements and are therefore forced to pay for it.

[66] This is the case throughout much of Vanuatu. Older participants in all three case studies recalled the post-WWII period as the time when rice consumption first started to become widespread.

[67] Rice and other non-local foods have a form of prestige at the local scale in Vanuatu (Reganvanu (2009).

Most believed the former reason was most likely and that a preference for rice was highest among younger generations. Mark, a local store owner explained:

> I saw the price of rice increase, but Mota Lavans like rice more than island food, so time when the price increases, everyone just pays it! Because rice is a habit. Plenty of us, especially young people, say "oh, if rice doesn't come any more, we'll die now! If I don't eat rice, I'm dead!". In the morning, they get up and they eat rice, bread and tinned meat. They don't want island food. It's true. We've lost the good island food to a rice habit!

Participants referred to consumption of *kaekae blong waetman* in the context of shifting aspirations towards a more 'Western' lifestyle. Many referred to it in the context of laziness and changing values, as unlike island food production, rice requires little labour input and little preparation time.

All discussed increasing dependence on imports in general as something that had become entrenched over time and something that was now difficult – culturally – to reverse. One participant in particular, believed import dependence to have become entrenched during the time period when Mota Lava was regularly exporting copra (see Section 4.5.3 below), thus receiving a fairly regular external flow of cash. He explained that although the cash economy was no longer as reliable, consumption patterns were entrenched. Given current unreliable access to imports, participants discussed the need to revert to a more self-sufficient mode of operation. They recognised that reversing the trend is difficult however, because socio-cultural change results in fewer younger people being able to engage in self-sufficient agriculture.

A key informant from the Torba Province believed high rice dependence may relate to a traditional focus on breadfruit preservation for times of hardship (Chapter Five, Section 5.6.3). As breadfruit preservation is no longer practiced to a functional degree, rice may provide a substitute. Another reason may be high

relative wealth; this key informant believed Mota Lava had a larger urban diaspora than other islands, meaning remittance flows are higher.

4.5.2 Access to imported food

A household's access to imported food is primarily dependent upon: a) the ability of local store owners to obtain goods (both financially and physically), and; b) the ability of households to pay for them. Both are irregular on Mota Lava because of irregular shipping and an uncertain cash economy.

Rice and other types of imported goods are accessed by two main means. The predominant and most regular means is purchasing these goods from small locally owned stores. To a lesser extent, goods are sent as gifts from family living in Port Vila, Luganville and elsewhere. Individuals moving between islands often bring goods into the island with them on their return. Some participants noted that goods are sometimes purchased directly from trading ships (this is also noted by Campbell (1985) and Tapari (1993)) although participants in my research thought that this was no longer widespread.

Food and other goods – *kako* (cargo) – are imported by a number of small, privately-owned village stores. Store owners source *kako* from "Chinese stores" in Luganville. Financially, the ability of store owners to source *kako* is uncertain because of food price increases and the high prevalence of account credit owing – '*kaon'* in *Bislama*. Smaller stores often close for months at a time when turnover drops and owners are unable to purchase *kako*.

In the past, community stores were mainly co-operative societies (Campbell, 1985). In 1981 Campbell (1985: 127) identified two co-operative societies which accounted for around 95% of external commerce. This situation has changed with the failure of the co-operative system. Co-operative society operations depend largely on copra income. As copra production declined post-1980, revenue to support co-operative operations was lost. Extensive *kaon* ultimately drove co-operatives under.

Privately-owned stores are now the predominant means of accessing imported food for most households, but face similar challenges to co-operatives. In 1991, Tapari (1993: 202) counted 17 private "trade stores" and one co-operative. In 2008, the situation was much the same – participant estimates of the total number of private stores at the western end of the island range from 15-17[68]. In *storian* with private store owners, it became evident that *kaon* is a significant problem for private stores (as it was with co-operative stores). Many households are deeply in debt to stores because cash incomes with which to purchase food can be sporadic. A local store owner explained that he allowed *kaon* as he did not want to deny households food – he felt a certain obligation to provide a 'social service'. As *kaon* has always been a feature of local community stores, he had little choice – consumers expect this 'social service'. Because (in part) of these financial challenges, stores are unable to provide a constant supply of rice and other staples to meet the needs of households.

4.5.2.1 Shipping

The more significant determinant of import availability however, is frequency of shipping services to Mota Lava. Simply, Mark explained:

> If no ship comes to bring the *kako*, I don't have *kako* inside my store!
> It's a big problem for the community.

Ships are commercial trading vessels that visit islands to collect copra and sell goods. Thus, the cash economy is, and always has been, deeply dependant on shipping links in small islands like Mota Lava.

Insufficient shipping is the primary reason for instable access to imported food. Smaller and lighter items such as tea, sugar, milk powder, crackers and tobacco can be imported regularly via airplane. Air Vanuatu services Mota Lava twice a week with a nine-seater plane (a BN-2A Islander), and store owners frequently

[68] Stores frequently go thorough periods of inactivity.

place weekly orders. However, demand for heavier items – the staples of rice and flour – can only be properly met by importing in bulk via ship. Small amounts of these staples are regularly brought in on the bi-weekly flights – the Islander will take a maximum of 11 25kg bags of rice per flight. This provides a regular trickle but is expensive for households and not enough quantity to meet the needs of the community, especially during times of local food shortage. The cost of air freight is significantly higher than the cost of sea freight, thus driving prices up and increasing financial stress. Store owners rarely make a substantial profit from rice imported via air, as consumers struggle to meet the cost with any significant mark-up added.

According to local participants, Mota Lava has not had a regular shipping service since independence in 1980. Before independence, domestic shipping was dominated by expatriate trading companies, with ships owned by the colonial administrations fulfilling a non-commercial role (Dunbar, 1982). The Vanuatu Co-operative Federation also controlled its own small shipping company. It is likely that it was government and co-operative owned ships that serviced the northern islands prior to independence; participants referred to these ships as '*ol ship blong condominium' ('*ships belonging to the British/French condominium government'). Prior to independence, ships would service the Banks Islands to sell *kako* and buy copra on a fairly regular schedule – at least once per month according to local participants.

Domestic shipping is now dominated by the private sector and is largely unregulated[69]. There are no licensed routes and no freight rate regulation. As a result, services are driven entirely by economic profitability and demand patterns. In a study of Vanuatu's inter-island shipping funded by the New Zealand Agency for International Development (NZAID), the Banks outer-islands

[69] There are two government-owned ships but these are chartered to private sector companies and thus operate privately.

are identified as being in the 2% of Vanuatu's rural population facing "unsatisfactory" services. According to their criteria, "satisfactory" involves at least four, evenly spaced visits per year (McGregor Murray and Co. Ltd., 2008). According to local participants, Mota Lava (although probably not included in their classification of 'Banks outer-islands') rarely receives this. Given smallness, distance from the main centres and limited communication infrastructure, Mota Lava and other islands in Torba are uncompetitive and have no market power in the inter-island shipping market.

Ships that service Mota Lava are owned or operated by store owners in Luganville. Tapari (1993) indicates that in 1991, ships serviced Mota Lava on average less than once every six weeks. This has become even less frequent over the last 17 years. In 2008, participants in my research indicated that ships come on average every 3 to 4 months (see Figure 22). According to participants this has been a regular feature, particularly since the year 2000 when one of the more regular service operators ceased to visit[70]. This is a significant strain for store owners and households, as bulk rice shipments generally last for two or three months at the most. How long the rice lasts is also dependent upon freight rates, as when operators set high rates, store owners are forced to import smaller amounts. Paul explained:

> If, after two months a ship comes, this is good. But right now – oh, four months, ship hasn't come! This is a problem. Before the ships came more – once a month.
>
> *When did this change start?*
>
> After we became independant. After independance life was hard. Maybe the government can answer your question. Because the

[70] In 2000 the Coastal Trading Act 1981 that had previously regulated routes and freight rates and passanger fares was repealed perhaps contributing to this situation (McGregor Murray and Co Ltd., 2008).

> governemnt doesnt look after its own people. I think that the government must give a ship to us to service us.

It is widely recognised by local people that a private and unregulated shipping market marginalises smaller and more isolated communities.

Figure 22 *Kako* unloaded on the beach following a rare ship visit

How often the ship visits is dependent upon the needs of ship operators based in Luganville. There is no set schedule. Ship operators put a message out on Radio Vanuatu a week or so prior to the intended visit. Local store owners on Mota Lava then telephone the operator with an order, or failing that, use a satellite phone based at the clinic. Therefore, ability of store owners to import *kako* is also contingent upon communications technology. Radio Vanuatu is one of the most important means of sourcing information in the Torba Province. There are two problems here. Firstly, Mota Lava has few working radios, or batteries to run them. Some households have 'hand cranked' rechargeable radios. The major constraint however, is that Mota Lava rarely receives a strong Radio Vanuatu broadcast. It is highly weather dependant. The NZAID Inter-island Shipping Study recognises this as a major constraint and recommends the restoration of

shortwave services as priority in this regard (McGregor Murray and Co. Ltd., 2008). Secondly, although the island has two telephones (Telecom Vanuatu Limited), the lines are frequently down. It is not uncommon for Mota Lava (and the wider Banks Islands) to have no telephone access for months at a time. Recent mobile phone coverage in Vanuatu (Digicel Vanuatu) did not extend to the Northern and Southern islands at the time of my research[71]. Mota Lava regularly misses out on ship visits because of a lack of effective communications technology.

Lack of reliable shipping and communications restricts the ability of Mota Lavans to access rice and other imported goods that now play a prominent role in food security and wellbeing. Compounding this, the ability to meet the costs of these goods – when available – is becoming an increasing struggle for many households. Limited and unreliable access to imported food creates specific vulnerabilities in the incidence of climate stress, as island-based food sources are no longer sufficient to ensure food security.

4.5.2.2 Food price increases

The ability of households to meet the costs of rice and other imports alongside other household expenses is becoming increasingly uncertain. While food prices increase, opportunities to earn cash remain limited. Being a product of wider development constraints, these stresses are largely outside the direct control of the community.

World commodity prices have increased substantially in recent years with commodities traded in the Pacific at least doubling since 2001-2002. The price of

[71] I have recently heard that Mota Lava now has access to the Telecom Vanuatu Limited mobile phone network. I am unable to confirm the effectiveness of this however. Outer islands often face problems with mobile phone reception. Charging mobile phones is also a problem at the village scale as electricity is scarce and solar chargers supplied with many of the cheaper mobile phones are ineffective.

rice rose sharply in early 2008 (ADB, 2008). This increase has had a marked impact at the household scale in Vanuatu. What these global-scale factors mean at the local-scale in Mota Lava is that the cost of rice has almost doubled for households over the past year. A local store owner explained that the price of rice and other *kako* began to noticeably increase during 2006 and has climbed steadily since then with a sharp increase in early 2008. Increases in world fuel prices has driven the cost of domestic freight up. According to this participant, the price of a 25kg bag of rice in Luganville has increased from approximately 2500 Vatu (USD $26) to as much as 4000 Vatu (USD $42) in the past year. By the time he has paid freight and added a mark-up, a 25kg bag of rice will cost a Mota Lavan household around 6000 Vatu (around USD $63). This increases to 8000 Vatu when bags are imported via airplane.

Import price increases have been experienced in the past. Campbell (1985) (as well as a number of local participants in my research) identifies that Mota Lava experienced drastic increases in import prices during 1981, noting inflation also driven by oil price increases (not matched by household income increases) as a primary driver of severe economic instability. At this time, however, Mota Lava was exporting copra so at least had a significant (if variable) external revenue source. Participants in my research indicated that meeting recent high food prices is difficult and uncertain for many households because of largely unreliable sources of household cash income.

4.5.3 The cash economy

The cash economy has played an increasingly significant role in people's lives on Mota Lava since the late 1930's (Vienne, 1979, cited in Campbell, 1985). Over time, activities for cash generation have become increasingly localised as the national shipping market and international market fluctuations have rendered cash crop export unviable. As is also found by Fazey et al. (2010) in the Solomon Islands, market growth and a social shift towards the use of money as the main means of exchange, leaves isolated communities like Mota Lava highly

vulnerable to fluctuations in global commodity prices, particularly given high transport costs. While money is now vital to wellbeing, it is hard to accumulate. Income generation opportunities are few, there is seldom surplus to save for hard times and credit schemes are non-existent. Communities like Mota Lava are therefore not well equipped, financially, to respond to uncertain environmental – and market – conditions. Many participants in my research referred to a negative sense of dependency that reliance on cash for wellbeing brings, because opportunities for earning cash are so few. Mota Lava is constrained in its opportunities to progress towards a 'capitalist' economic mode of production, despite this being what is aimed for in national development planning (see Government of Vanuatu, no date).

In the past – especially prior to independence in 1980 – copra exports were the primary means of household cash generation (see Campbell, 1985 and Tapari, 1993). This situation has changed due to global price slumps and Mota Lava's increasing uncompetativeness in a privatised shipping market. Based on *storian*, remittances appear to have succeeded copra earnings as the predominant source of external revenue flowing into Mota Lava.

Over the past 10 years, a largely localised economy has become pronounced. The government salaries of school teachers, clinic staff, provincial government staff, and (seemingly) remittances[72] form the major external flows of cash. Through *storian,* I ascertained that most households currently generate cash by producing and selling goods within the island. The major strategies are: selling garden and tree crops, selling fish and other seafood, selling kava, selling mats, baskets and other 'handicrafts', small business (stores, bakery, kava bars), fundraising[73], and

[72] The quantity of remittances is unknown because transfers are informal.

[73] Fundraisers are organised by community groups (such as women's church affiliated group, school) or by individual households, usually to raise money for school fees. They usually involve cooking food to sell at mini-festivals.

labour[74] (Tapari (1993) provides an in-depth account of Mota Lava's local economy). In addition to this largely local economy, some households produce and export small amounts of copra. The cash economy on Mota Lava was frequently referred to by participants as 'circular' – money circles around the community. There is a certain degree of 'moral exchange' associated with this 'circular' economy. It is a form of wealth redistribution, particularly during periods when school fees are due.

The economy has become increasingly localised over the past 28 years or so, with the steady decline in copra export. Thomas explained how cash is normally generated by households on Mota Lava:

> These days, if we want to work, we have to work here [Mota Lava]. I have to go work for the school teacher, or the dresser [clinic staff], or I can ask someone who owns a store if he has work for me – or I have to go ask someone I know has money if he has work. Before, it was different, we didn't have this local economy.
>
> *When did the local economy start?*
>
> I'm not exactly sure, but I think it began to increase when the teachers started to come to the island – when education increased a lot, after independence.
>
> *But before independence…you said copra was the main way?*
>
> Yes. Copra was the way before independence because the ship would come every month. Not like now. We've got coconuts, but no one cuts copra because we don't have shipping.

[74] It is common for wealthier households (such as store owners, kava bar operators) to employ labourers to repair houses, clean yards, or build canoes, for example.

Mota Lava's smallness and isolation limits cash generation options. This is primarily due to increasingly irregular shipping and lack of economies of scale. A key informant from the Torba Province stated:

> Torba doesn't have absolute poverty. But it has relative poverty – you can classify it as hardship. Hardship in this place comes from no access to income or access to market to sell the products we have. People don't have access to the money that they want. There are no choices.

The Torba Rural Economic Development Initiative (REDI) Five Year Master Plan[75] identifies this as the primary constraint to economic development (Government of Vanuatu, no date). A key informant at the Torba Provincial Government Headquarters explained that the Torba province is marginalised in national development processes because of its smallness, remoteness and isolation:

> The Vanuatu Government has a culture where they forget about Torba. They think it's too expensive and difficult to do projects here. That's why we get left out of projects. Sometimes you hear in Torba, that it's like Torba doesn't even exist. But many people are living in this province. I've talked with plenty of NGO's and organisations that make community development. But capacity at the NGO level is low to come out here – the aid donors don't like it. Too expensive, too difficult to follow up on projects. So all the money goes to communities that are close to Vila and Santo.

The Torba Province receives little assistance from external organisations. This point was brought up in many informal discussions with provincial and central government officials and NGO staff during my research. The main implications

[75] Each province in Vanuatu has a REDI plan, organised around five year strategies. REDI plans are the provincial economic development strategy planning documents.

are a severe lack of access to goods and services and limited socio-economic opportunities in the Banks Islands. As is also discussed by Fazey et al. (2010) in the Solomon Islands context, Mota Lavans – and key informants from the Torba Provincial headquarters – felt frustrated at their dislocation from national political and decision-making processes.

All participants reflected this concern in *storian* – participants could identify many potential 'roads' to making money, but there is very limited access to external markets. In the past, copra was the mainstay of the cash economy. Prior to independence, copra was the dominant cash earner and it is copra that began Mota Lava's significant integration with the market economy (around 1930) with its myriad social and economic consequences. At the provincial scale, copra still accounts for 33% of the economy despite low prices and small trade volumes (Government of Vanuatu, no date). Copra remains the only cash crop on Mota Lava as lack of shipping services, infrastructure, skills, capacity and financial knowledge limits alternative options (Government of Vanuatu, no date).

According to local participants, copra export was the dominant economic earner until approximately 15 years ago. Until price slumps in the 1970's copra provided a significant revenue stream to Torba and it was mainly before this time that plantations were established and expanded (see Campbell 1985). Price slumps contributed to reduced shipping services as trade volumes decreased (Government of Vanuatu, no date). Copra was identified as the main source of household income by Campbell (1985) in 1981 and later, by Tapari (1993) in 1991 (although Tapari (1993) notes a decrease in copra-derived income from 1980 to 1991). *Storian* indicates that copra, although still produced in small amounts, currently plays a far less significant role in the island economy than in 1991[76]. In

[76] Up-to-date village-scale census data is unavailable and community records of copra exports have not been kept since the breakdown of the cooperative societies in the early 1980's. As such, I am unable to quantify current copra exports or the number of households engaged in copra production.

the absence of regular, reliable and regulated shipping links between Torba and Luganville, copra is no longer a viable or sustainable cash earner on Mota Lava. All participants agreed that locally-based cash generation activities are now more important cash earners than copra export for most households.

In the absence of any reliable export opportunity, remittances flowing from wage-earning Mota Lava diaspora in Port Vila and Luganville appear to be the contemporary major source of external revenue. Most local participants believed that remittances are now the major source of external cash. Campbell (1985) identified likely remittance-dependence in 1981 and my research suggests this is now more prominent. Given the informal nature of transfers, it is difficult to measure remittance flows. Money and goods are sent person-to-person via the bi-weekly Air Vanuatu flights. The 2006 Household Income and Expenditure Survey states that gifts constitute a mere 2% of total annual household income in the Torba province (Government of Vanuatu, 2007a). It is likely that this figure is higher however; participants explained that households will seldom reveal the amount of money received via remittances.

To summarise Section 4.5, ensuring food security requires improving local export opportunities, improving shipping services and improving local self-sufficiency in food production. Improving access to imported food – now an integral contemporary vulnerability reduction tool – is dependent largely upon distant factors and processes outside community control.

4.7 Summary

This chapter has established that vulnerability to climate change on Mota Lava is underpinned by social factors and processes that have little to do directly with climate. These social factors and processes are at the core of many community problems regardless of climate stress and are therefore priorities to address through local eyes. The next chapter examines the specific implications of these social processes in the context of vulnerability to climate stress.

Social change is reducing the size of the adaptive toolbox. Traditional vulnerability reduction tools are decreasing in prevalence, while broader development constraints limit the development and effectiveness of contemporary tools. Broad socio-cultural change is at the core of the fast erosion of traditional knowledge. Changing values, worldviews and knowledge systems increases the communication gap between older and younger generations and reduces community leadership capacity. The result is less capacity to maintain, apply and adapt traditional vulnerability reduction tools to changing environmental and social situations. The social apparatus holding traditional tools in place is changing. Maintaining and protecting the social apparatus is fundamental to effective CBA because it is this that enables the community to be flexible and shape their own adaptive solutions to changing conditions.

Many traditional tools are/were based within subsistence agricultural livelihood systems. As a result of socio-cultural change, agricultural livelihoods are changing to a less disaster-resilient form. Socio-cultural change shapes changing gardening practices and spatial land use patterns, causing island-based food production to become increasingly unsustainable. This situation is exacerbated by population growth. The Mota Lava community is less able to ensure food security from island-based sources – both in 'normal' times, and during periods of climate stress – and this is a significant concern for the future. Vulnerability reduction is becoming less internalised in society and livelihoods with increasing reliance on imports for food security. Access to imports, however, is increasingly uncertain because of higher-scale market processes and development constraints.

These issues exemplify most directly how structural forces at a national, regional and global scale are at the core of local vulnerability situations and the congruence between 'disaster vulnerability' and 'development constraints' in a Pacific island community context. Over time, 'development' processes (distant to the community in terms of power and influence) have increasingly tied Mota Lava into a market economy and shaped socio-cultural change. As is outlined in

Mota Lava's NVD, colonialism, modernisation and post-colonial politics have driven most of the negative aspects of social change and increasing vulnerability emphasised by Mota Lavans – namely a loss of *kastom*. However, as household dependency on the market economy becomes more and more entrenched, Mota Lava's effective participation in it is becoming increasingly unstable and uncertain. Through local eyes, 'development' and the market economy is not providing many positive social benefits for Mota Lavans. Instead of promoting and enabling contemporary vulnerability reduction tools – thereby increasing the adaptive toolbox to build capacity for CBA – 'development' is limiting them. CBA and development processes cannot be addressed separately (see Chapter Six).

CHAPTER 5

Event-centered vulnerability

5.1 Introduction

This chapter outlines event-centred vulnerability on Mota Lava. After Allen (2003), event-centred vulnerability refers to manifestations of vulnerability that are directly tied to climate stress-related events. In the NVD (Chapter Four, Figure 20), the direct causes of climate stress-centred vulnerability are contained in the blue circle. These direct causes take the form of reductions in effectiveness of traditional vulnerability reduction tools. Discussing these direct causes *after* discussing the indirect social causes may seem back-to-front. However, I have chosen to present the chapters in this order because participants prioritised the indirect causes as the most important aspects of vulnerability to address. Direct causes of vulnerability stem from these indirect causes.

This chapter focuses on food insecurity related to tropical cyclone. It draws heavily on the example of food insecurity following Tropical Cyclone Funa in early 2008. This event highlighted the social causes of increasing vulnerability to food insecurity in the Mota Lava community.

5.2 Tropical Cyclone Funa

The significance of the social factors and processes outlined throughout Chapter Four, came to the fore in early 2008 when Cyclone Funa struck Mota Lava causing widespread and prolonged food insecurity. The physical attributes of Cyclone Funa – wind speed, rainfall, duration – were significantly less severe than major cyclones in participants' memory that had occurred over the past century. The impacts on food security, however, were the most severe and long lasting that participants could recall.

Tropical Cyclone Funa struck Mota Lava during night on January 17th. Cyclone Funa approached Vanuatu on an easterly track, intensifying to category 2[77] as it passed Santo. Ten minute average winds were 102km/h when Cyclone Funa passed 30km to the north of Ambae Island (Terry, 2008). I can assume a similar intensity when it passed by Mota Lava shortly prior to this. Figure 23 shows Cyclone Funa's track.

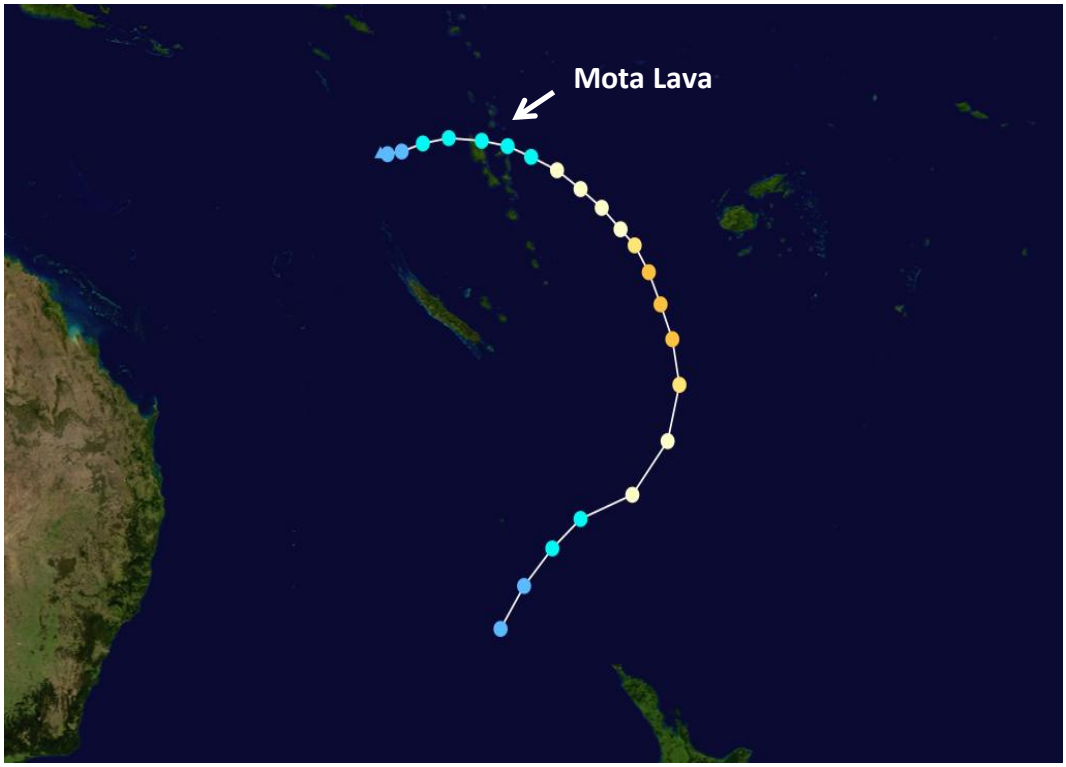

Figure 23 Tropical Cyclone Funa's track (image: Wikipedia, 2010)

Participants frequently compared this cyclone to two major cyclones that had been experienced by the community over the past century. Extremely severe cyclones occurred in 1939 and 1972 (Cyclone Wendy). Both these cyclones had far more severe physical attributes and caused widespread destruction on the island (Campbell, 1985). Nonetheless, participants perceived food insecurity

[77] On the Australian Regional Tropical Cyclone Intensity Scale (ARTCIS).

following Cyclone Funa to have been greater than following these two major cyclones.

Participants discussed the initial three to four months following Cyclone Funa as being particularly problematic. School was cancelled because children had low energy levels caused by lack of nutritious food. At times, the only food available was green coconut, fish and papaya. These impacts disproportionately affected women who, as primary caregivers, would often go without. Many participants relayed stories of sickness resulting from the consumption of rotten fruits and vegetables. At the time of my fieldwork, nine months after cyclone occurrence, the community was still experiencing food shortages although the most dire conditions had improved. Food remained rationed and was of low diversity. *Stil* had increased markedly in the community as people struggled to provide for their families.

The reasons for lasting food insecurity are discussed throughout the remainder of this chapter. Due to this prominent issue, it follows that a large proportion of *storian* was dedicated to analysing vulnerability in the context of this event. The majority of analysis throughout this chapter draws on participant experiences of, and reflections on, the situation surrounding Cyclone Funa.

5.3 The adaptive toolbox in the *taem bifo*: buffers and contingency plans

Traditional vulnerability reduction tools were/are both purposeful and incidental[78]. By purposeful I mean practices consciously and specifically undertaken above and beyond 'normal' everyday and livelihood activities to minimise climate-related vulnerabilities, for example, food preservation strategies. By incidental, I mean mechanisms ingrained in the 'normal' systems and processes of livelihoods and *kastom* that may not be specifically undertaken

[78] I borrow this terminology from Burton et al. (1973), although my application of it is different from theirs.

to minimise climate-related vulnerability, for example, the way people practice gardening. In many cases, incidental mechanisms that minimise the potential for negative impacts arising from climate stress are merely part of the normal 'way of doing things' and serve other social and livelihood functions.

Both of these features of vulnerability reduction in the *taem bifo* can be seen in Table 12. Table 12 presents some examples of common traditional vulnerability reduction mechanisms in Vanuatu, alongside their contemporary counterparts. These examples span food security, building techniques, social networks and environmental knowledge and are drawn from the three case studies I examined in my research. These findings have much in common with the overviews of traditional disaster risk reduction strategies in the Pacific islands by Campbell (2006) and Mercer et al. (2007).

In much of the literature regarding traditional knowledge and disaster risk reduction/climate change adaptation, local strategies for dealing with climate stress are referred to as 'coping mechanisms' or 'coping strategies' (e.g. Pelling and Uitto, 2001). This is restrictive in that it suggests short term and discrete practices directly linked to preparing for, coping with, and recovering from 'abnormal' or unusual periods of climate (Davis, 2009). In using the term 'vulnerability reduction tool' in this thesis I widen the scope to include practices that are indirectly linked to climate stresses and that are longer term, being ingrained within the systems of daily life and livelihoods.

An important feature of traditional vulnerability reduction tools is that they are/were largely woven into the fabric of everyday life and livelihoods. Johannes (1978, cited in Mercer et al., 2007) notes that traditional strategies are often so ingrained in daily life that the virtues often go unnoticed by 'outsiders' until the practice or system has weakened. In the context of Mota Lava specifically, Campbell (1990: 416) refers to traditional disaster response as "rooted in normality".

Table 12 Examples of traditional and contemporary mechanisms for managing climate stress. Based on case study findings from Tangoa Island, Mangaliliu village/Lelepa island, and Mota Lava.

Traditional mechanisms	Application	Contemporary mechanisms
Food security		
Multiple gardens per household	Not widely practiced	Imported food . rice, flour, ship biscuits, canned goods Non-traditional crops: manioc, *kumala*, fijian taro, banana varieties
Plant an abundance of weather resilient root crops	Still practiced although crop ratios are changing	
Agricultural seasonal calendar	No longer strongly adhered to	Disaster relief aid
Surplus yam production and storage	No longer practiced	Remittance flows
Harvesting restrictions on weather resilient wild-yam stocks	No longer practiced	
Food preservation breadfruit drying and fermentation	Some techniques still practiced in some areas	
Famine foods	No longer widely utilized	
Housing		
Cyclone resistant building methods: steeply angled roofs, low walls, rope bindings, no windows*	No longer widely practiced	'Modern' style house using local materials: shallow roofs, high walls, nails, windows
Plant building materials . sago palm, hardwoods.	Still widely practiced but declining	Import building materials for iron and sawn timber housing
Tie down roofs	Still widely practiced	Disaster relief Concrete block housing
Social networks		
Inter-community/inter-island trading links**	No longer practiced	Remittance flows
Intra-community resource sharing and exchange	Still widely practiced but changing form	Sharing limited to within extended family units and to elderly/widows/disabled. More individualistic focus

Chiefs facilitate collective recovery efforts	Not widely practiced.	Disaster relief aid Church leaders of ten play a more prominent role than Chiefs
Environmental knowledge		
Home, *nakamal*** and 'learning-by-doing' based knowledge dissemination	Not widely practiced	Government, donor, NGO and volunteer awareness projects and programmes
Traditional weather and disaster signals	Not widely practiced	Radio cyclone warnings and weather forecasts

*see Campbell (1984) for a detailed account of these features in Fiji. Much of this applies to the Vanuatu context.
** see Campbell (1990; 2006)
***Meeting house

To focus on food production, ensuring food security in the face of environmental uncertainty depended on a symbiotic mix of purposeful and incidental tools. The bulk of sustenance – particularly in the *taem bifo* – is provided by agriculture. Because wellbeing is dependent on natural environmental systems, it follows that when environmental conditions are variable and uncertain, agricultural production will come in peaks and troughs. In the *taem bifo*, mechanisms were inbuilt into agriculture and other aspects of livelihoods to minimise the impacts of troughs in production on wellbeing. Through a number of mechanisms discussed throughout the remainder of this chapter, agriculture-based livelihoods were – and to some extent still are – buffered against climate variability and extremes. This was in two main ways.

Firstly, 'normal' gardening practices and systems were 'designed[79]' to maximise food availability even when environmental conditions were not optimal, such as

[79] Culture and vulnerability reduction tools evolved together – many traditional vulnerability reduction mechanisms originating in the *taem bifo* were co-benefits of other social and livelihood systems rather than being consciously or explicitly 'designed' for this purpose. For example, the primary reason for surplus yam production and storage (discussed in Section 5.5.3.1) was to achieve status within the *suqe* rather than to buffer against cyclone or drought damage. This served an important vulnerability reduction function, however.

in the occurrence of a cyclone or a particularly dry year. This reduced the potential for undue strain on wellbeing. Some examples of this include a specific seasonal planting calendar, the production of surpluses and planting of multiple gardens by each household (these features had other social functions beyond vulnerability reduction). Resource use was flexible and diverse. These mechanisms were largely incidental and unconscious, being ingrained in daily, monthly and yearly subsistence livelihood systems, and facilitated by socio-cultural values, norms, mores and institutions.

Secondly, a number of purposeful mechanisms were employed to 'plug the holes' in food availability resultant of expected or unexpected troughs in productivity. Although incidental mechanisms minimised the potential for climate-related losses, these are fallible. For example, just because the traditional agricultural calendar minimises the potential for crop damage during rainy months, an uncertain and variable climate means that crop production will not be optimal every year. During a La Niña, for example, rain may come in months that are usually dry. Crop failure is not a completely unusual or unexpected event. In the *taem bifo*, people engaged many purposeful tools to account for these contingencies, such as yam storage and dry breadfruit production. Importantly, these purposeful tools, although consciously for vulnerability reduction, do not operate separately from everyday life and livelihoods. Their feasibility and continuation is dependent upon the time, resources, knowledge, value systems and incentives available in the 'normal' structures of everyday life.

In the main, this chapter focuses on the consequences of a loss of incidental and purposeful traditional vulnerability reduction tools from the adaptive toolbox. However, it is important to emphasise that traditional vulnerability reduction tools should not be assumed to be 'perfect' or superior to contemporary

mechanisms[80]. This is particularly the case with climate change, as changes to climate variability and extremes may exceed the capacity of traditional knowledge. As outlined in the previous chapter however, increasing vulnerability results from a decreasing capacity to adapt traditional tools to changing conditions, matched with insufficient availability of contemporary tools. I recognise that some aspects of traditional vulnerability reduction discussed throughout this chapter may no longer be feasible or rational, given social change (Paulson, 1993; Pelling and Uitto, 2001; Mercer et al., 2007).

5.4 Changing perceptions, changing priorities: changing incentives?

Changing perceptions of the importance of locally-based vulnerability reduction initiatives was a common theme to emerge from *storian*. Participants noted changes over time in motivation to practice traditional vulnerability reduction within the community. Many participants believed that increasingly fewer resources and less time and effort are now dedicated to proactive, local vulnerability reduction mechanisms than in the *taem bifo*. Increasingly, fewer long and short term preparations (both incidental and purposeful) are made to buffer livelihoods against climate stress and plan for environmental contingencies. Based on *storian*, this is linked to two – by no means mutually exclusive – indirect and distant causes: socio-cultural change and reliance on external resource flows, in particular disaster relief. Both reduce the cultural internalisation of vulnerability reduction practices.

[80] Although participants perceive their recent ancestors to have dealt better with climate stress, in most societies people have a tendency to view the past with 'rose tinted glasses'. In his historical analysis, Campbell (1985) includes missionary accounts from the Banks Islands that indicate severe food shortages and famine resulting from tropical cyclones and droughts in the 1800s and early 1900s. It is likely that perceptions of acceptable types and levels of impacts and losses have changed over time. The safety nets afforded by contemporary mechanisms such as disaster relief and the availability of imports, although reducing 'self sufficiency', may prevent losses experienced in the past such as starvation and death.

Participants voiced concern about the low perceived importance of traditional vulnerability reduction practices within the 'normal' activities of everyday life. In particular, participants attributed prolonged food shortages following Cyclone Funa to a lack of long term "preparation". For instance, participants identified that people expend food resources on more *lafets* (celebrations or parties) now rather than using them to maintain island-based food security, as in the past. In discussing why this was the case, participants referenced changing risk perceptions and priorities. Judy explained that today:

> …people don't care, people don't think about disaster. They don't think to the future, or about what might happen tomorrow or next week or next month. They don't take disaster seriously.

Some – particularly younger participants – attributed the lack of preparation to the fact that it had been a long time since the last cyclone – people had 'forgotten' about the importance of proactive preparation. Older participants stressed, however, that serious cyclones have always been experienced infrequently and that preparation used to be integrated into the systems of everyday life.

Cyclone Funa was frequently referred to as something of a 'wake up call', highlighting the importance of – and lack of engagement in – local vulnerability reduction mechanisms. Importantly, participants often discussed this as a "choice" – there are many things people *could* have done to proactively reduce vulnerability, however, most did not do them. This is an important point – many tools may still exist in principal, but this does not necessarily mean that people will engage them to the best of their ability (Wisner, 2004). As discussed in Chapter Four, de-valuation of traditional knowledge reduces incentives to put knowledge into practice – traditional knowledge regarding vulnerability reduction is no different.

Some participants believed the 'wake up call' provided by Cyclone Funa aided in raising the perceived importance of vulnerability reduction practices in the

community, thus potentially reviving and improving some traditional practices. As Samuel stated:

> Olivia, I think disaster must happen more often because it's a good reminder! Because now, I've heard that plenty of people have to the bush to carry 'wild yam' to come and plant in their gardens [wild yam areas]. Because people know that if it [disaster] happens one time again, they will have 'wild yam' to eat! I think it's good that disaster comes now! (laughter).

Many participants made similar observations. However, the majority of participants did not believe this motivation would last or would translate into long-term actions. For example, in *storian* regarding the changing methods of building houses, Kenneth explained:

> People have thrown out the thinking belonging to disaster. When they make any building they don't think about cyclone. They just want a type of house that looks good. Small beams, small posts, like the tourist bungalows that the white people like. That's what people want now. When the cyclone strikes, they think back, but it's too late. When the cyclones finished, they go ahead and build another one with small wood.

Changing perceptions of the priority of vulnerability reduction (both long and short term) at the community scale are a product of complex changing socio-cultural situations. The foundational cultural values identified by participants as facilitating effective practices for food security relate to '*fuja luk luk'* and are discussed in Chapter Four. Specific values include: having a strong work ethic and planning for the future. All participants linked changes in this socio-cultural framework to increasing climate-centred vulnerability.

That preparing for environmental contingencies is not generally viewed as a priority highlights the increasing separation of vulnerability reduction from the

systems and structures of everyday life and livelihoods. Because of socio-cultural change and changing livelihoods in general, vulnerability reduction is now more of a conscious effort requiring discrete activities, than in the *taem bifo*. Whereas in the past vulnerability reduction was largely 'woven in' to everyday activities, it is now 'unravelling' from these. There is less space in the contemporary nature of livelihoods for traditional vulnerability reduction. I emphasise however, that climate variability and extremes themselves were not viewed as a departure from 'normality' (Campbell, 1990) by participants in my research[81]. Despite changes in the structure of dealing with them, they remain an accepted part of everyday life. Many participants alluded to the socio-cultural framework underpinning livelihoods as shifting from a 'culture of self-sufficiency' to a 'culture of dependency'.

5.4.1 Psychological dependency[82]? The role of disaster relief in vulnerability (reduction)

Participants frequently referenced a loss of self-sufficiency in dealing with climate stress as central to increasing vulnerability on Mota Lava. Participants were concerned about the level of dependence on external resource flows: disaster relief, remittances and imported food. With the expectation of external resource flows, dealing with climate stress has become far more reactive than in the *taem bifo*. It is important to emphasise that 'dependence' does not automatically equal vulnerability. Where these external resource flows are durable, reliable and sustainable, depending on them to ensure food security in

[81] I recognise that this may change if climate stresses were to become more frequent or intense with climate change.

[82] Reganvanu (2005) discusses the creation of an overall 'psychology of dependency' in Vanuatu – a national cultural psyche – as having its roots in the era of missionary influence. Regenvanu (2005) contends that the main feature of this dependency is self-devaluation of ni-Vanuatu capacities based in *kastom*.

times of climate stress may be a rational and efficient response[83]. However, as these external resource flows are determined largely by centralized and international agencies, they are largely outside the influence of the community. Recent experience has highlighted that external resource flows cannot be relied upon to prevent food insecurity on Mota Lava.

5.4.1.1 'Formal' food relief

The presence of disaster relief aid over the past century has significantly affected the nature of traditional vulnerability reduction on Mota Lava. This issue is widely addressed in the literature regarding disaster vulnerability in the Pacific (see Paulson, 1993; Benson, 1997; Pelling and Uitto, 2001; Campbell, 2006) and has been firmly established by Campbell (1985; 1990) in the context of Mota Lava specifically. The following draws, and builds, upon Campbell (1985; 1990).

Paulson (1993) identifies that external relief efforts in the Pacific can engender a 'psychology' of dependence. This was a key theme that emerged from *storian* in my research. The *expectation* of food relief, particularly 'formal' relief coming from the Vanuatu Government and international donors (mainly the Australian and New Zealand governments) was cited by participants as central to changing perceptions of and incentives for locally-based traditional vulnerability reduction. Participants believed that the expectation of relief is a major contributor to a reduction in incentives to engage in locally-based practices. It is important to emphasise though, that it is not the only contributor and that broader socio-cultural change and resultant changes to livelihoods contribute also (these are not mutually exclusive).

[83] For example, in the *taem bifo,* inter-community exchange was an integral feature of the traditional vulnerability reduction toolbox in the Banks Islands. These external resource flows were more within Mota Lava's sphere of influence, however (Campbell, 1990).

Participants voiced an increasing sense of vulnerability as dependence upon disaster relief and other external resources – over which they are able to exert little control – increases. As stated by Sarah:

> People see that disaster is here. Food is short. But they don't take it seriously enough to do anything about it. They forget about planning for disaster. They don't make a plan to save up for time belonging to cyclone. They have the time! Plenty of time! They just don't care, they think that Australia and New Zealand will provide the food every time.

Participants perceive an overall decline in self-sufficiency as the most concerning aspect of vulnerability to climate stress, as access to external resource flows – namely disaster relief and imported food – is becoming increasingly uncertain.

The Mota Lava community 'expects' relief, because food relief has effectively offset local food shortages following major periods of climate stress (notably cyclones, but drought as well) over the past decade. The most notable shipments of relief were received from the colonial Condominium government following major cyclones in 1939, 1948 and, most significantly, 1972 (source: local participants). According to Campbell (1990), relief coordinated by the national (post-independence) government (sources of relief were mainly international) was sent to the Banks Islands following a cyclone in 1988 although this was not referenced by participants in my research.

Shipments received in 1939 and 1972 provided enough rice, dried corn and vegetables to sustain the community even in the absence of local food security mechanisms (which, according to participants, were still fairly strong at these times), for many months following the event. For example, one participant explained that plenty of yam was available following the cyclone in 1939 because traditional planting systems were strong at this time. After the cyclone this yam was harvested and consumed. In addition to this however, the formal relief arrived. The same situation occurred in 1972. A yam crop was available following

Cyclone Wendy (albeit a smaller one given the reductions in traditional practices at that time). However, due to the expectation of relief, many households did not bother harvesting it[84]. Instead, they relied on the relief shipment which successfully offset food insecurity. Many participants explicitly stated that the relief experience of 1972 reduced motivation to engage in long and short term traditional vulnerability reduction mechanisms in the decades following. All participants referenced food relief when discussing the contemporary ability to deal with climate stress. Disaster relief is now a fundamental contemporary vulnerability reduction mechanism on Mota Lava.

Community concerns regarding dependence on external relief provision became a reality in 2008 in the months following Cyclone Funa. The food relief which was received following Cyclone Funa was nowhere near enough to offset the island-based food deficit resulting from the cyclone and lack of traditional vulnerability reduction. I am unable to access official disaster and relief reports. Participants on Mota Lava stated that each household received one bag of rice each, regardless of household size. All participants stated that the rice received was not enough to offset food shortages. For larger households, bags lasted only one or two weeks.

According to a number of provincial and central government officials, dependence on disaster relief is a pervasive issue in disaster management throughout Vanuatu as a whole. Despite a recent rise in government led, donor led, and NGO led awareness initiatives aimed at promoting self-sufficiency in local disaster management a 'culture of dependency' remains, where communities tend to wait for relief instead of using their own resources to prepare and recover (source: key informant interview, National Disaster Management Office, Vanuatu). However, through local eyes there are likely to be few reasons to take on board these messages coming from 'outsiders'. On Mota

[84] This is also noted by Campbell (1985: 191): " … much of the yam crop rotted in the ground".

Lava comprehensive formal relief has seen the community through a number of major local food shortages over the past century – relying on these externally available resources could be seen as a perfectly rational and efficient strategy. As discussed in Chapter Four, education and local knowledge is developed through lived experiences. The community have lived experience of disaster relief as an effective disaster management strategy and adjusted vulnerability reduction mechanisms accordingly. Therefore, rather than actioning the messages imparted by these outside organisations, it makes sense that communities will 'live with what they know'. Mota Lava has received its share of awareness initiatives and these have had little impact, as explained to me by James:

> …but their [government's] idea, we didn't take it up. The idea that the government was talking about was that you people in New Zealand and Australia, you don't want to send food and money every time. The government said that they must make a special budget – that's why the government said they had an educational idea that we should prepare for a cyclone that might come. Because aid, it won't come all the time. They came with a film, and they paid for fuel for the generator and they put the film up in the *nakamal*. Oh! It was a good evening. We watched the film, but no one took up the idea it was making. They just laughed and laughed and laughed at the actors in the film! They didn't take it seriously.

I attended a community council of chiefs meeting where '*desasta*' was an item on the agenda, assumedly to address the issues that had come to light following Cyclone Funa. The focus of discussion was improving damage reporting so as to increase the amount of formal relief received during *desasta*, rather than on initiatives for increasing self-sufficiency in coping.

Campbell (1985; 1990) outlines in detail the wider reaching impacts that disaster relief has had on agriculture on Mota Lava. In brief, relief received in 1939 included planting material for manioc*, kumala* and *taro viti*, named so due to its

arrival on a steamer ship from Fiji (also called '*taro blong stima'/ '*taro belonging to the steamer ship').

5.4.1.2 Informal food relief: remittance flows

In addition to formal disaster relief, 'informal' relief – or remittances – supplied by Mota Lavan diaspora living in the urban centres of Vanuatu are an important contemporary vulnerability reduction tool. I address remittances here in the context of 'dependency' on external resource flows, as this was how participants most frequently framed the issue. However, remittances are more within the direct sphere of control of the Mota Lava community[85] meaning they are potentially less distant in terms of power than formal relief.

Following Cyclone Funa, rice, sugar, tea, flour and other staple food items were amassed and shipped to the island by the large Mota Lava community residing in Port Vila and Luganville. This shipment arrived in late April. No records of quantity exist, but a provincial government official who observed bags of rice being loaded onto the ship at both ports estimated this to be 100-200 25kg bags. Local participants said that in addition to the collective community effort, individual family-to-family transfers of food occurred in the months following the cyclone via the bi-weekly Air Vanuatu service. Participants indicated that receipts of remittances remained higher than 'normal' in October and November at the time of my research – the informal relief effort was on-going.

This informal relief contributed to 'plugging the holes' in food security left by a lack of effective locally-based traditional tools, coupled with an inadequate formal relief effort. As explained by Jolene, remittances often play an important role in 'hard times':

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[85] The Mota Lavan community, like many communities in Vanuatu and the wider Pacific, operates across space. Although identity comes from the homeland, people are highly mobile. 'Community' is not fixed to a static place – Mota Lavans that have migrated to Port Vila or Luganville remain an active part of the island community.

> After the cyclone came, some of the Mota Lava community in Vila send food back to the island, because many people on the island have family in Vila and Santo [Luganville]. When we go through a hard time like this one, they must think about their mother and father, their sister, their brother, they must send food and other things like cement and corrugated iron.

It is established in the literature that remittance flows (particularly in-kind remittances) increase following a natural disaster and that these often play an important role in disaster recovery (Ahlburg, 1991; Warrick, 2004). Participants noted that remittance proclivity depends upon the financial situation of remitters but that in the context of *desasta,* diaspora will always find ways to assist – even if this means going without themselves (see also, Warrick, 2004).

Some participants discussed remittances with the same negative 'dependency' connotations as when discussing formal relief. The *expectation* of remittances may have some of the same 'psychological' impacts on incentives to engage in island-based traditional vulnerability reduction – many participants believed that remittances produced a certain degree of inertia in vulnerability reduction, for example, Jonathon framed remittances negatively:

> A problem is that Mota Lava has a big community in Vila so on the island, everyone depends too much on people in Vila. People sit back and wait instead of working hard to prepare. Cyclone comes, it hurts us a lot, but we just sit back and wait. But people in Vila have expenses of their own. People on the island don't learn how to face disaster. They have a lot of dependence.

Participants noted a certain degree of reluctance within the diaspora community to provide 'hand-outs' of imported food when there are plenty of opportunities to produce food on the island.

Although this is another form of 'dependency' on external resource flows, reliance on remittance flows is more of a 'local' vulnerability reduction mechanism in that it is embedded largely within the kinship, cultural and economic structures of the Mota Lava community. Informal relief, although flowing from a spatially distant source, is less distant in terms of *power* than formal relief. Many did not express the same sense of powerlessness when discussing the role of remittances in vulnerability reduction as when discussing the role of formal relief. Rather, it is a form of assistance that is based within traditional kinship and value systems – remittances are based on cultural rather than regional political obligations.

Migrant populations have long been a significant feature of the Mota Lava community (see Campbell, 1985). Participant estimates of the diaspora community in Port Vila ranged from 100 to 150, and in Luganville, 50 to 100. Most family groups have at least one member living in urban centres. Participants emphasised that Mota Lavans living in urban centres are a cohesive community. According to island-based participants, second and even third generation migrants identify themselves as 'Mota Lavan' and maintain a strong connection to the island. Many who spend a large proportion of their lives living and working elsewhere return to the island in old age (although they may have lost access to land). Being based upon traditional kinship and cultural structures, informal relief may be more reliable into the future than formal relief provision[86].

Remittances are a more 'home grown' contemporary mechanism than reliance on formal relief, as local actors can make higher contributions to decision making about what they receive, how much, how often, and how it is used. Remittances are also a two way process with goods (e.g. yams, seafood, breadfruit) also being

[86] The durability of remittance flows in the Pacific region is dependent upon many cultural and economic factors and is an area of much debate (Connell, 1981; Bertram and Watters, 1985; Ahlburg, 1991; Macpherson, 1994; Brown and Foster, 1995; Brown, 1998; Poirine, 1998; Warrick, 2004; Bertram, 2006).

sent to diaspora. It could be argued that reliance on remittances is a contemporary form of a traditional tool, being based in traditional structures of exchange, collective reciprocity and community. Participants generally viewed this form of 'dependency' as having more positive contributions to vulnerability reduction than dependence on formal relief.

Within the bounds of my research, there was not scope to examine these issues in depth. Preliminary findings suggest that remittances play an important contemporary role in vulnerability reduction, enabling opportunities for spreading risk (Adger, et al., 2002) and providing a 'home-grown' social safety net by contributing to filling the gaps left by ineffective formal relief. The role of migration and remittances in climate change adaptation on Mota Lava warrants further research and is a recognised gap in the literature (Barnett, 2001; ADB, 2009; Barnett and Webber, 2010; Barnett and Chamberlain, 2010).

5.4.2 The role of imported food in vulnerability reduction

The consumption of imported food is an important contemporary vulnerability reduction tool on Mota Lava. Chapter Four outlined the problems relating to dependency on imported food in 'normal' times. These concerns translate directly into event-centred vulnerability in the incidence of climate stress, as was exemplified by Cyclone Funa. Although imported food – particularly rice – is now integral to coping with climate stress, it is not always available and not always affordable to households.

Cyclone Funa highlighted that the unavailability of imported rice during times of climate stress is a major cause of food insecurity. Following Cyclone Funa, extensive crop damage resulted from reduced incidental vulnerability reduction tools. Many purposeful tools were absent. Formal and informal relief was insufficient to plug the holes in island food production. Imported food was required to make up the shortfalls. However, sufficient imported food was not accessible following the cyclone.

Prior to the cyclone, a ship had not serviced the island for some months and the rice had begun to run out by the time the cyclone hit in January. Formal relief was delivered on a special ship in early February. Following the cyclone a *kako* ship did not come until June, five months later. As always, meeting the costs of this rice, when it did finally arrive, limited accessibility for many households (see Chapter Four).

The relatively high availability of imports following incidences of climate stress in the decades leading up to independence entrenched the role of rice in contemporary vulnerability reduction. Even prior to the year 2000, shipping remained regular enough to ensure a higher level of food security. For instance, many participants compared the situation following Cyclone Funa to the situation following a drought that occurred in the late 1990's. Peter explained:

> …we ate everything that was already in the ground but we couldn't plant because the ground was too hard. We had to eat all the old crops that were tough, when we could find them. But in this time, the shipping delivery was a bit better than it is now. It serviced us well. After two months, it came and we had plenty of rice – no more hungry time.

The consumption of imported food has become an important contemporary vulnerability reduction strategy on Mota Lava. Like formal disaster relief however, its availability is largely outside the direct control of the community. Wider structural development forces are manifested in climate-centered vulnerability.

5.5 Incidental tools

I now move to a more descriptive discussion regarding direct causes of food insecurity in the incidence of a cyclone. These causes relate to changes in the prevalence or effectiveness of traditional vulnerability reduction tools that are embedded in livelihoods. These traditional tools are incidental – the 'normal'

way of gardening is changing and this heightens vulnerability to climate variability and extremes, as livelihoods are less buffered against contingencies. Chapter Four outlined why agricultural practices are changing in general. This section outlines the consequences of this in the incidence of climate stress. It identifies specific features of agricultural change that are increasing vulnerability to food insecurity.

The tools discussed are those that participants perceived to be important to vulnerability reduction in the contemporary situation – they are either still in use to some degree or in some form, or have been in use until very recently. There are many traditional tools that were not emphasised by participants either because they are extinct, or because they are simply no longer feasible or relevant in the contemporary situation. The majority of traditional mechanisms discussed in this section and the next are those that still contribute to vulnerability reduction, albeit to a different degree, and in a different form, to the *taem bifo*.

Participants identified four main features of the contemporary gardening system that cause it to be less buffered against climate stress than in the *taem bifo*. These are:

- Planting cycles are changing and the fallow period is shorter.
- The size and number of gardens per household is lower.
- Some types of garden are becoming less prevalent.
- Crop varieties and the relative proportions of these planted within the gardening system are changing (see Box 9). In particular, yam and the production of a yam surplus is declining in prevalence.
- The seasonal planting calendar that structures planting sequences is changing.

I examine these in turn below. These features are, of course, closely interlinked. Many of the changes revolve around the declining prevalence of yam in the gardening system.

These features increase the vulnerability of the gardening system in two respects. Firstly, the overall volume and constancy of island food produced is lower. Reduced size, number and diversity of gardens, and changing planting cycles reduce the quantity – and quality – of crops grown per household. The consequence is that the amount of island food likely to remain edible following climate-related damage to gardens is reduced. Secondly, some features specifically increase the susceptibility of gardening systems to damage from climate variability and extremes. These include the loss of some types of especially disaster-resilient gardens, changes to the proportions of certain crop varieties grown and changes to the traditional seasonal planting calendar. These specifically reduce the climate resilience of island-based food production systems.

5.5.1 Planting successions and fallow period

Cultivation practices have changed over time in Mota Lava. Changes in the garden planting cycle in established planting areas influences vulnerability reduction capacity. This is because the changes: a) impact soil quality because of reduced fallow period, thus affecting the productivity of gardening land, and; b) reduce the total quantity of crops (particularly yam) planted, and available for consumption, per household per year. The major crops forming the basis of garden production on Mota Lava are indicated in Box 9.

***'Kaekae blong karen'/*food from the garden**

The range of ground and tree crops that constitute subsistence food sources is extremely wide. There are some staple crops however, that form the basis of subsistence livelihoods. These are listed below:

Kastom	**Introduced**
Yam (Dioscorea spp.)	Manioc (*Manihot esculenta*)
*Wovile (*sweet yam) (*Dioscorea esculenta)*	Taro Fiji (Fijian taro) (*Xanthosoma sagittifolium*)
Aelan taro (island taro) (*Colocasia esculenta*)	*Kumala* (sweet potato) (*Ipomoea batatus*)
Aelan kabbis (island cabbage) (*Hibiscus manihot*)	Banana (Musa spp.) – many varieties
Breadfruit (*Artocarpus altilisor*)	
Coconut (*Cocos nucifera*)	

Box 8 Staple food crops on Mota Lava

The traditional Mota Lava gardening system was characterised by the features outlined in Box 10. According to local participants, this was the system followed by '*bubu bifo'* – grandparents and great grandparents – up until the early 1900's.

The important outcome of this system in the context of food security was that because of the crop varieties planted, the multiple land areas under production, and the length of the fallow, island food was available all year round. Gardens were generally planted in twice in a year. In local language, the first planting is called *netemag* and the second *netetgei*. *Nete* means 'year', *mag* means 'first', and *tgei* means 'second'. The first planting stage on each piece of land was almost completely yam with some *aelan taro* intercropped, and the second planting *aelan taro*, *wovile*, or yam again.

Traditional gardening system, Mota Lava

- At least three pieces of established gardening land per household under production at one time, at three different geographical areas (point, middle, Valua). It was common to have up to eight or nine pieces of land under production at different stages of the planting cycle.
- Three main annual planting periods. Each piece of land is planted at a different time.
- Two successive stages of planting on each piece of land per year: the first planting is the main crop. The total cultivation period of a piece of land was one to two years.
- A distinct yam crop making up the first planting stage (and sometimes the second planting stage) on each piece of land.
- A fallow period following the two planting stages of between five and ten years (source: local participants).

Box 9 Features of the traditional gardening system on Mota Lava (source: local participants)

Different yam varieties take different lengths of time to mature but on average, the first planting stage would be harvested after six or seven months and the second planting stage after five or six months, depending on what it contained. This planting system has changed. The contemporary system commonly described by participants in my research is characterised by the features outlined in Box 11[87].

[87] This has many exceptions. I *storianed* with many older community members who still maintained multiple gardens, at multiple sites, still planted predominantly yam and managed to maintain a lengthy fallow period. What I describe here is a trend that was discussed by all participants as a priority concern in the community.

Contemporary gardening system, Mota Lava

- Fewer parcels of established gardening land under production (usually one or two only) at fewer geographical locations (often only land at the point).
- Less distinct annual planting periods.
- At least three successive planting stages on each piece of land with total cultivation time being upwards of three years.
- Less distinct planting stages with higher prevalence of mixed crops, introduced crops and fewer yams.
- A fallow period of between zero to three years .

Box 10 Features of the contemporary gardening system on Mota Lava

A 'transitional' system was referenced by participants that followed a similar pattern to the traditional system. The difference is that this system involves three successive planting stages and therefore a reduced fallow period – two to three years, according to participants. This transitional system retained the traditional characteristic of having multiple pieces of land under cultivation at any one time. This is roughly the system identified by Campbell (1985: 90) and to some extent is still followed currently. This system involved a large proportion of introduced crops in all planting stages, but particularly in the second and third stages. According to Campbell (1985) the third stage was entirely manioc. The typical contemporary planting system described by participants (Box 11) has two key differences to this 'transitional' system. Firstly, the fallow period has reduced further (for the reasons outlined in Chapter Four). Secondly, the pieces of land under cultivation at one time are significantly fewer.

Figure 24 shows the extent of regrowth when a garden is left to fallow for less than a year, which is now the norm.

Figure 11 A garden left to fallow. This is typically the extent of re-vegetation during the fallow – grass and low lying vegetation.

Furthermore, the distinct first stage of planting (yam) is declining in prevalence. The first stage of planting is now largely a mix of manioc, taro and banana with a small proportion of yam. Yam is seldom planted in subsequent planting stages. Simon, a younger participant, explained his planting system to me:

> Ok, I've got two gardens. One is here [point], one is in the middle. The first planting is banana, with a bit of yam inside. When the yam is ready, I dig it out and in the hole where it was, I put *kumala* with some taro in this hole.
>
> *What happens after, when the kumala and taro are ready?*
>
> Harvest, them – this is just my way – the garden just sits. I clean the banana stumps, ok, let it go now. For the bush to come back again.

> Ok, three or four months it sits, it grows. After, I make a new garden again, because the grass has made the soil good again.

In summary, the cultivation phase of a piece of gardening land has increased and the fallow period decreased. This has occurred concurrently with a decrease in the number of gardens under production at any one time, and the increasing prevalence of introduced crop varieties. While the cultivation period used to be less than two years, it is now more than three and in many instances, essentially continuous.

5.5.2 Volume of food crops produced: size and number of gardens

The 'normal' production of a high volume of crops per household helps to offset food insecurity in the incidence of climate stress. In simple terms, the more households rely on island-based food sources to meet dietary requirements in 'normal' times, the more food secure they will be in *taem blong desasta* because the less they will have to rely on unreliable external resource flows.

In the *taem bifo*, enough food had to be produced within the agricultural food production system to meet a number of household requirements. The main requirements were: dietary requirements, cultural and ceremonial requirements, and disaster risk reduction requirements. These basic requirements remain the same in the contemporary situation although a further category can be added: economic requirements[88]. With socio-cultural change the quantities needed to meet these requirements have declined, mainly because of changes to *cultural* requirements. As discussed in Chapter Four, imported food consumption has

[88] This includes producing crops to sell to each other, to sell to local government employees, to sell at local fundraising events, and to donate to school and church fundraisers. Although there are now economic demands on garden food production these are limited on Mota Lava due to the lack of any central organised market. This contrasts to my other case study communities where due to relative proximity to commercial centres and a more prevalent market economy, producing crops for sale compromised a significant portion of local production requirements.

reduced the quantity of island food needed over the past century (enabled in the past by copra production) although this trend is now causing food insecurity. The current island-based food production system does not sufficiently meet household requirements in the absence of imported food. Participants identified that deficits commonly typify agricultural food production with a changing work ethic (Chapter Four).

Having a large and diverse volume of healthy crops should ensure that there is a fairly low probability of a moderate cyclone (like Funa) completely destroying a household's entire gardening system[89]. Some participants I discussed this issue with had not personally faced severe food shortages in the months following Cyclone Funa because in 'normal' times, their households produced high volumes of local food and consumed low volumes of imported food. Samuel explained:

> If you have a good garden, some food in the garden will stay good. But if you don't have a good garden, all the food will be spoiled. Plenty people here don't have good gardens because they don't work. That's why plenty have shortage now [October]. Plenty of us on the island have only a few banana, few taro, few manioc. That's why now we have a problem with disaster.

Samuel's household had sufficient crops, when supplemented with small quantities of rice, to offset significant shortages following Cyclone Funa. The general consensus however, was that few households are now planting a sufficient volume of crops to see them through times of climate stress. The decline in the practice of '*yu mas plant evri dei*' was frequently referenced in this context.

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[89] This depends on the exposure characteristics. It is unlikely that enough crops will remain undamaged to completely sustain food security – the addition of purposeful food security mechanisms (discussed in Section 5.6) is likely to be needed to plug the holes.

Michael, an older participant, recalled that following the severe cyclone in 1939, enough root crops remained in the ground to sustain people in the months following, despite the extreme damage to gardens. He remarked, however, that:

> If the cyclone like 1939 comes back today, plenty trouble will hit us because today, plenty people don't work. They don't make work like before – like in 1939. My children – they don't have enough gardens, their gardens are small! If a big cyclone comes today, trouble will be big in comparison to before.

Participants identified two types of gardens prevalent in the *taem bifo* that are being lost from the gardening system, thus further reducing the volumes of crops produced. These are bush gardens and 'home gardens'. Bush gardens have been introduced in Chapter Four. Although forest is initially cleared to make bush gardens (crops require light and precipitation), large trees and scrub are left making them less exposed to climatic variations than established garden areas located in areas of sparser forest cover[90].

In the *taem bifo*, bush gardens were highly important for buffering livelihoods against climate variability and extremes. James explained their vulnerability reduction function:

> Bush gardens are like an insurance garden. When you need food you just go and carry out some small crops. Maybe all your crops are growing and not ready for harvest, or maybe your yams have been spoiled by a cyclone – you don't worry, you just go to bush garden. They are like a backup garden.

[90] This also means that bush gardens are only suitable for certain types of crops. Yam cannot be grown in bush gardens as it requires the exposure of the established gardens. Most other root crops, green leafy crops, bananas and fruits can be grown fairly well.

Forest cover provides shade, thus aiding in regulating temperature and moisture loss. Crops from bush gardens are particularly important during drought conditions where tree and vegetation cover extends crop survival. Where it is impossible to plant in established garden areas due to dryness, bush gardens can be cultivated for longer – this was frequently cited as an integral mechanism for coping with drought. Importantly, forest cover provides a wind break, protecting gardens against cyclone damage.

Participants recalled that following Cyclone Wendy (1972), although bush gardens sustained damage from falling trees, they were an important source of food as a good proportion of crops survived extreme winds. Low lying, sparser vegetated land where established gardens are located sustained more damage as most trees were blown down and more crops were destroyed. Although bush gardens are still maintained by some households, because of socio-cultural change, their prevalence is declining. Following Cyclone Funa, few households – especially younger households – had this back-up source of crops.

'Home gardens' also provided a 'back up' service in the *taem bifo*. These gardens, consisting of small plots in an around the village, have been largely lost from the island agricultural system. Home gardens included 'raised beds' constructed from woven bamboo and cane where yams and fast growing leafy green vegetables were planted. Called *noqolag* in local language, the intention of these beds was to provide a ready food source when going to the gardens was not possible due to weather, or sickness[91]. Beds were placed strategically in sheltered areas. Lack of incentives among younger people was the most frequent reason cited for the loss of home gardens. It is likely that the presence of imported food fills the perceived gap that home gardens use to fill. An agricultural extension project has

[91] The primary intention may have been to produce large yams (of a certain *kastom* variety) for ceremonial purposes. Raised beds would have enabled more soil depth than planting directly in the ground, similar to the yam mounds described by Weightman (1989:77).

attempted to reinstate home gardens on Mota Lava with limited success. According to a provincial government official, people have little interest as the perceived need to do the required work is not strong enough.

5.5.3 Crop diversity

The size, number and productivity of gardens maintained by a household shape their food security in times of climate stress. What is *in* these gardens is also an important determinant – some crops are more climate resilient than others. Crop diversity has changed on Mota Lava with specific implications for local vulnerability reduction. The relative proportions of various crops grown in the gardening system have changed over the past century with the loss of some traditional varieties and the increase in non-traditional varieties. Participants noted that these changes have been most rapid and significant over the past four or five decades.

Changes in crop type can be summarised by a decrease in yam (varieties, number and quality) and an increase in two alternative crops: banana and manioc. *Aelan taro* (traditional)[92], *taro viti*, *wovile* (traditional) and *kumala* are also important staples[93]. Varieties of yam are a traditional crop with significant socio-cultural value and functions. In the *taem bifo*, yam production was the linchpin of Mota Lava's agricultural system. Yam was the basis of diets and the crop around which planting cycles, the agricultural calendar and many social activities revolved. Yam production practices enabled a surplus to be produced and stored – this is

[92] *Aelan taro* has always been an integral component of the traditional gardening system. *Taro viti* arrived following the cyclone in 1939, but is grown in much the same way and has similar properties to *aelan taro.* Some participants believed a larger proportion of taro is now grown than in the *taem bifo*, some believed roughly the same amount is grown today. The important point is that proportionally, yam plays a less prominent role in food production.

[93] These are the staple crops forming the basis of diets although many other crops are grown at various times in and around gardens such as *aelan kabbis*, pineapple, papaya, cucumber, pumpkin, lettuce, chinese cabbage, water melon, corn and sugar cane.

examined in more detail below (Section 5.5.3.1). Although yam is still grown in small proportions, manioc, banana and taro are now the basis of island-based food production.

A high proportion of manioc and banana, and a low proportion of yam in Mota Lava's agricultural system heighten vulnerability to food insecurity in the incidence of cyclones. Although the reasons for a high production of yam in the *taem bifo* were predominantly and consciously socio-cultural, its relative climate resilience was an important co-benefit. A mature yam crop (and a mature *wovile* crop) will remain relatively undamaged in the incidence of cyclone or stormy weather. Although above ground vines will be damaged by high winds, the underground tubers will remain undamaged for up to three months afterward, provided that conditions are relatively dry (very wet or water logged soil will cause rotting). Yams can also be stored following harvest. Taro is also fairly resilient – it will remain edible in the ground for one or two months following a cyclone, provided the damage to stems is not too extreme (which causes tubers to rot). Taro, unlike yam and *wovile*, cannot be stored and needs to be consumed shortly after harvesting. Taro can be preserved through fermentation although participants did not reference this in my research.

Thus, provided yam was mature, most root crops within the traditional agricultural system could be harvested and consumed (or stored, see Section 5.5.3.1 below) following a cyclone. This was the case following the 1939 cyclone. Provided maturity prior to occurrence, a cyclone may not have significantly detracted from regular garden production in the *taem bifo*, as the staple yam crop – the basis of production – could still be consumed. Samuel explained that high proportions of traditionally climate resilient crops were a key component of vulnerability reduction in the *taem bifo:*

> Grandparents before planted things that were safe in the garden – yam, *aelan taro*, *wovile*, and 'wild yam' in the bush. Not like today!

> Today they all plant banana – when a cyclone comes banana is destroyed!

The climate resilience of these crops – particularly yam – depended on the traditional agricultural calendar (Section 5.5.4 below)[94].

Manioc and banana, in comparison, are less resilient in the context of cyclones. Unlike yam and taro, a manioc crop is susceptible to damage from high winds. Tubers quickly rot in the ground following a cyclone as its bushy above-ground foliage cause tubers to uproot or be damaged during high winds. Movement of foliage causes damages to tuber skins which quickly causes decay (Weightman, 1989). This can be avoided, to an extent, by cutting the foliage prior to cyclone season, or when a cyclone warning is received (see Section 5.6.4 below). Manioc cannot be stored following harvest meaning that even if tubers are able to be salvaged, it will last for a short time only once it is out of the ground.

Bananas are also susceptible to damage from high winds. Cyclone Funa – a moderate cyclone – essentially destroyed Mota Lava's entire banana stocks. At the time of my fieldwork, nine months after the cyclone, a banana shortage was still apparent. A key informant from the Torba provincial government headquarters attributed Mota Lava's high food insecurity following Cyclone Funa to the high proportion of banana and breadfruit (see below) they rely upon relative to other islands in the Torba province:

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[94] There are numerous environmental variables that affect the climate resilience of these crops, in particular, the month of cyclone occurrence, the amount and duration of rainfall in the months following and weather conditions in the months leading up to cyclone season. Cyclone Wendy in 1972 caused significant damage to Mota Lava's yam crop as the cyclone occured before the yams had reached maturity. Like all vulnerability reduction mechanisms, climate resilient agriculture is fallible, hence the importance of a range of purposeful mechanisms to fill potential troughs in production.

> They plant too much banana. Other islands have banana but it's small – they rely more on root crops. But Mota Lava relies too much on tree crops. When the cyclone comes they face much damage because the bananas and breadfruit are all destroyed.

It is unclear why Mota Lava appears to plant a larger proportion of banana than other islands in Torba.

The reasons for a high proportion of breadfruit in diets are perhaps clearer. Breadfruit is a traditional staple tree crop and remains an important component of diets in 'normal' times. Breadfruit has two seasons: June/July and November/December. These seasons were important to the structure of the traditional agricultural calendar. Breadfruit is highly susceptible to cyclone damage. Cyclone Funa (January) caused significant damage to Mota Lava's breadfruit crop. At the time of my fieldwork, (October/November), breadfruit was only just beginning to come back as trees had not produced the mid-year crop. Mota Lava's high reliance on breadfruit as a dominant dietary staple is likely tied to the traditional practices of drying and fermenting as purposeful tools for coping with troughs in food production (see Section 5.6.3). Older participants indicated that in the *taem bifo* the consumption of fresh breadfruit was not so predominant. Although the practices of drying and fermenting breadfruit has waned in recent years, the culture of producing high quantities of breadfruit remains. A high reliance on breadfruit for food security in the absence of preservation techniques may increase vulnerability to climate stress.

Manioc and banana are not strictly *kastom,* having come to Mota Lava from elsewhere at various times throughout the past century. Manioc first became prominent in the Mota Lava agricultural system following the cyclone in 1939 when planting material was sent as disaster relief. More planting material arrived following Cyclone Wendy in 1972, further increasing its prevalence (source: local participants; Campbell, 1985). Although a variety of wild banana existed on Mota Lava in the *taem bifo* (this variety has almost been lost), the multiple varieties of

banana grown in gardens today are non-local, having arrived on Mota Lava since the 1960's (source: local participants). Banana was not a staple cultivated crop in the *taem bifo*, playing only a supplementary role in diets. Participants estimated that there are now over 20 varieties of banana grown on Mota Lava. The majority of these are starchy plantain-type varieties used in the same way as root vegetables – boiled, roasted and grated into *laplap*.

Traditional gardening systems (Box 10) centred on yam production. Older participants recalled their parents' and grandparents' gardens as being dedicated predominantly to yam (at least in the first stage of planting) with smaller proportions of *aelan taro* and *wovile* produced in successive plantings. Now, participants explained that this practice is no longer prevalent with a low proportion of yam intercropped with a high proportion of manioc, banana and taro[95] typifying the first planting stage of a contemporary garden (Box 11, Figure 25 and 26). Peter explained:

> Before, when my grandfather planted yam, he planted just yam. Yam with a small amount of taro. But when we make a garden now, we plant manioc with banana. All mixed in with some small yam. We have almost lost yam!

Despite the presence of manioc since the 1940's, yams remained a prominent crop until relatively recently.

[95] An older participant recalled that when he was a boy (in the 1940s) it was *tambu* to intercrop yam simultaneously with banana and taro viti as this combination increased susceptibility to a pest beetle that damaged yam. Taro viti and banana required a separate garden area or were planted in the second planting stage after yam was harvested. This *tambu* no longer exists and it is common to see yam intercropped with other crops.

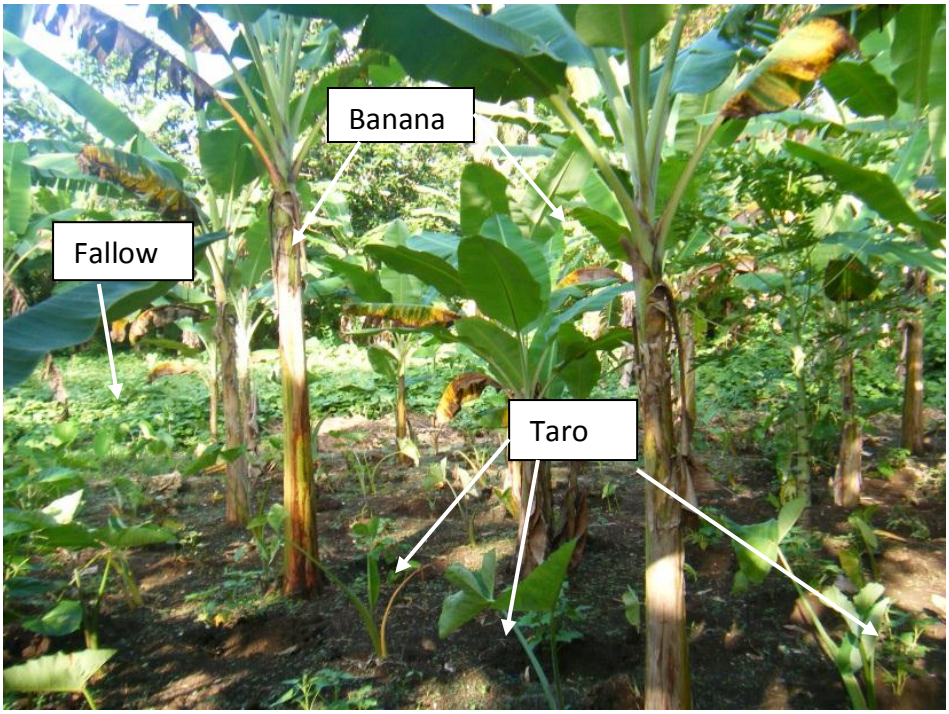

Figure 25 Garden in the first stage of planting: taro intercropped with banana

Figure 26 First planting stage of a contemporary established garden. This reflects the typical contemporary planting style with manioc around the outside edges of the garden area. Not visible in the figure, but contained in this garden are: cucumber, water melon and *aelan kabbis*. Breadfruit, coconut and nut trees form a border.

Participants recalled that planting cycles had commonly involved an initial planting of (mainly) yam followed by secondary and (sometimes) tertiary planting of manioc/taro following the yam harvest up until two or three decades ago (the 'transitional' system outlined in Section 5.5.1 above). In 1981, Campbell (1985) found yams to be the dominant cultivar in the initial planting stages (see Campbell, 1985: 90).

This would have enabled a significant proportion of yams to be produced. At the time of my fieldwork, most participants believed yam to be produced in a much lower proportion than at this time with manioc, banana and taro dominating the initial planting stages. Participants explained that it is now common to see manioc and banana dominating a garden in all stages of the planting cycle, as the stages of the planting cycle become less distinct.

Of course, this is a perception of a general trend – many older participants in my research still produced higher quantities of yam, especially those maintaining gardens at sites at Valua where space is not so tight and soil quality is better. Figure 26 shows a garden in the initial planting stage where yam is a prominent crop, although note large proportions of manioc and banana forming a border around the outer edges of the plot. Many gardens that I worked in during fieldwork contained significant portions of yam. Participants stressed that yam remains an important crop in times of climate stress and many households relied on yam crops following Cyclone Funa.

Maintaining diversity in gardening systems is important to buffering agricultural systems against climate variability and extremes. Different crops are suited to different environmental conditions. When conditions are not optimal for one crop variety, other varieties need to remain relatively unaffected to ensure food security. Yam and *kumala* thrive in dry conditions thus being able to withstand droughts fairly well, but will decay in very wet conditions. Conversely, taro is able to withstand wet conditions but will die back during a drought. Banana is one of the first crops to die during droughts and does not withstand very wet

conditions. Manioc can cope relatively well with unusually high or low rainfall, although not as well are yam or taro respectively.

Although gardening systems on Mota Lava remain fairly diverse with a mix of traditional and introduced crops of varying resilience to different types of climate stress, the trend towards a heavier reliance on manioc and banana for food security was of concern to participants as neither of these are particularly climate resilient. One of the main underlying factors influencing this trend is decreasing soil quality in established gardening areas on the point where the majority of food production occurs. Yams require fertile soil to grow well. The potential to grow large amounts of yam on the point is declining, even if the incentive remained. Yam crops are significantly more productive when grown at Valua where soil remains of better quality. Due to the decline in soil quality for the social reasons described in Chapter Four, yam crops do not reach a comparable size to those grown in the *taem bifo*. Older participants recalled yams from their childhood as being significantly larger and more plentiful.

The ascendancy of manioc is likely to be both a cause and a symptom of declining soil quality. It is a cause because manioc increases the cultivation period of gardens, thus reducing fallow (Campbell, 1985). It is a symptom because manioc can be grown in poor quality soil. Another major reason for the ascendancy of manioc and banana is that these crops require low labour inputs. Yam requires high labour inputs to produce a high quality crop. Yam requires regular labour to weed gardens and train the growing vines. As discussed in Chapter Four, labour inputs to subsistence agriculture are declining, especially among younger people. In contrast, manioc and banana require few labour inputs.

5.5.3.1 Yam surplus and storage

A fundamental feature of crop production in the *taem bifo* was the production of a yam surplus. This was an important vulnerability reduction mechanism. Traditionally, a large proportion of yam was produced within a household's

agricultural system so that a portion of the harvest could be stored. The purpose of this was to maintain a store of yam to be used above and beyond day to day consumption requirements, mainly for cultural purposes.

In the *taem bifo*, a household's yam harvest had to provide enough yams to meet the following requirements: consumption (yam was a dietary staple), planting material for the next garden, and cultural requirements. A surplus was produced to account mainly for the latter requirement. Yams, along with *aelan taro*, *wovile*, pigs, kava and shell money was the basis of the *kastom* economy on Mota Lava (source: local participants; Codrington, 1891). Achieving status within the *suqe* system depended upon the ability to produce high quality crops – the production of a yam surplus was fundamental to *suqe* membership. Yams were also required for basic day to day social functions such as food exchange, receiving guests and ceremonies to make up for wrong doings. Yams were required for specific ceremonial purposes, such as marriages, deaths, births and for annual festivals such as the new yam harvest and (in later years) Christian festivals such as Easter and Christmas. With the exception of membership to the *suqe*, the majority of other cultural requirements remain in some form. Yam retains its cultural significance and households still require yams for cultural purposes.

Following the main yam harvests, the highest quality yams would be selected and stored inside residential houses and specially constructed storage houses for up to a year. In the local language of Mota Lava, stored yam stocks are called *nihnagvat*.

This was practiced up until fairly recently; some older participants recalled their parents storing yams during their childhood in the 1930's and 1940's. Richard recalled:

> When you came to your grandfather's house, you'd see each side of the house would be the new yams that had been taken out of the

> garden. They stayed there. You were never short of yam, never short of food. Yam that was stored inside the house was *kastom* food.

Particularly valued varieties of yam were stored – three varieties according to a local participant.

An important function of the yam surplus and storage was that households had yams all through the year. This obviously also served an important vulnerability reduction function. In particular, the crop harvested in June/July served this function as a stored surplus from this harvest generally remained during the cyclone season (November to April), thus being able to make up for losses of other crops.

As a vulnerability reduction mechanism, yam storage can be seen as being both incidental and purposeful. The primary reason for the production of a surplus was cultural – this is evidenced by the fact that yams are no longer stored with a changing socio-cultural situation. However, it was widely consciously recognised that this also served as a source of back-up food if agricultural production were to trough, for instance, because of a cyclone. Some participants recalled that yam stores were eaten following the cyclone in 1939. However, a yam surplus is no longer produced for storage. Yams are reserved and stored following the main harvests, but only as planting stock.

Yam retains its cultural value, being required for contemporary forms of *kastom* ceremony and exchange, for example fundraisers, church festivals, school festivals, chief festivals, and national holiday celebrations. Yam remains a necessary part of marriage customs on Mota Lava forming part of the 'bride price' to which extended family members must contribute, sometimes multiple times per month. The 'expense' of these cultural requirements – in time and resources – was a priority concern of participants in the community. These cultural requirements place high demands on now limited yam production and this was frequently given as a reason for the loss of yam storage – there is not enough left over alongside consumption and planting stock requirements.

Cultural requirements take precedence and with an increasingly limited amount of yam planted, many participants stated that they rarely consumed any of their own yam harvest. This aspect of traditional vulnerability reduction has been lost as yam (including *wovile*) is the only root crop that can be successfully stored for any extended period of time without processing.

5.5.4 Seasonal calendar

As in many Pacific island agricultural systems (Pollock, 1992), the traditional sequence of planting activities on Mota Lava is dictated by the most significant crop – the yam. Mota Lava's sequence of planting activities – or agricultural 'calendar' – is structured around three annual planting periods. Traditionally, these periods are when a piece of land undergoes the first stage of planting. In the past, these three annual planting periods were when the majority of a household's yam crop was planted, since the first planting stage was predominantly yam.

This seasonal system had a number of key functions. Foremost, it structured planting so that island food – in the past, namely yam – was available (either from direct harvest or from storage) all year round[96]. The exception to this was during La Niña years when increased rainfall increased rotting. Importantly, the calendar ensured that a yam surplus was harvested and stored in the months leading up to the cyclone season (November through April). It maximised year-round yield by ensuring garden burning could occur during dry periods and growing periods could occur during periods of moderate precipitation. In particular, it structured planting to increase the chances of root crops being mature enough to withstanding a cyclone or stormy weather if this were to occur

[96] The exception to this was August which, in the *taem bifo*, was *taem blong hangri* (hungry time). August was the only month when no yam and few other crops were mature enough to harvest. Since the 1960's to 1970's the increase in banana and manioc means that *taem blong hangri* is no longer prevalent.

during cyclone season. However, older participants stressed that the main purpose of the traditional calendar was to 'prepare for *kastom*' by enabling a constant supply of yam, not to prepare for variability and extremes. In this way, following this seasonal calendar is both an incidental and purposeful vulnerability reduction tool.

Participants pointed out that in most years (the exception being La Niña years with increased rainfall), climatic conditions on Mota Lava allowed for a fairly good yam crop to be produced almost all year round, although the best yams (valuable ceremonially) were produced from the crop planted mid-year. The major reason for these three planting periods was to ensure a constant supply of yam all year round whether this be from direct harvest, or from storage.

This seasonal agricultural calendar has changed concurrently with changing crop diversity and the changing spatial geography of gardening activities. Carl, a younger participant, stated:

> Before, we worked in different seasons – each planting had its own months. If you plant in these months crops will grow well. It's our kastom. Now we just plant all about – any month, whenever you decide you want to plant, you just plant.

As was highlighted by Cyclone Funa, a decline in the traditional seasonal planting calendar is contributing to increasing vulnerability. Participants were concerned that the year-round reliability of garden produce had declined because crops were no longer planted in optimal climatic conditions.

It is important to bear in mind that, in the absence of climate variability and extremes, manioc essentially fills the gap left by the reduction of yam in the gardening system. Assuming enough pieces of land are cultivated to fulfil a household's needs, manioc is available all year round, thus meeting consumption

requirements that had been met by yam in the past[97]. Given that environmental uncertainty is a day to day reality however, the availability of manioc all year round cannot be relied upon to the same extent as the traditional system structured around yam – manioc is less climate resilient than yam when yam is planted in accordance with the traditional calendar.

The months corresponding with stages of the traditional planting sequence were difficult to ascertain in my research. Almost all participants indicated something different. This may have been because knowledge of the *kastom* agricultural calendar has been lost among younger generations – this was a frequently identified problem. It may also be because different families had different practices and because these have adapted and changed over time[98]. From *storian* with older participants in the community I could ascertain that the three planting periods in the agricultural sequence generally corresponded with the first planting stages of gardens at the three geographical locations – point, middle and Valua. Figure 27 displays the common seasonal periods identified by participants as being followed in the *taem bifo*, although numerous exceptions were discussed[99]. I use a Western calendar here as this is now the way in which the community orders their agricultural activities and social lives. Traditionally, environmental indicators structured agricultural activities, although most knowledge of these has been lost.

[97] Although as many participants recognised, manioc is less nutritious than yam (Weightman, 1989).

[98] For instance, some younger participants cited two, not three, planting periods as '*kastom*'.

[99] This calendar is somewhat different to the calendar identified by Campbell (1985) in the early 1980's.

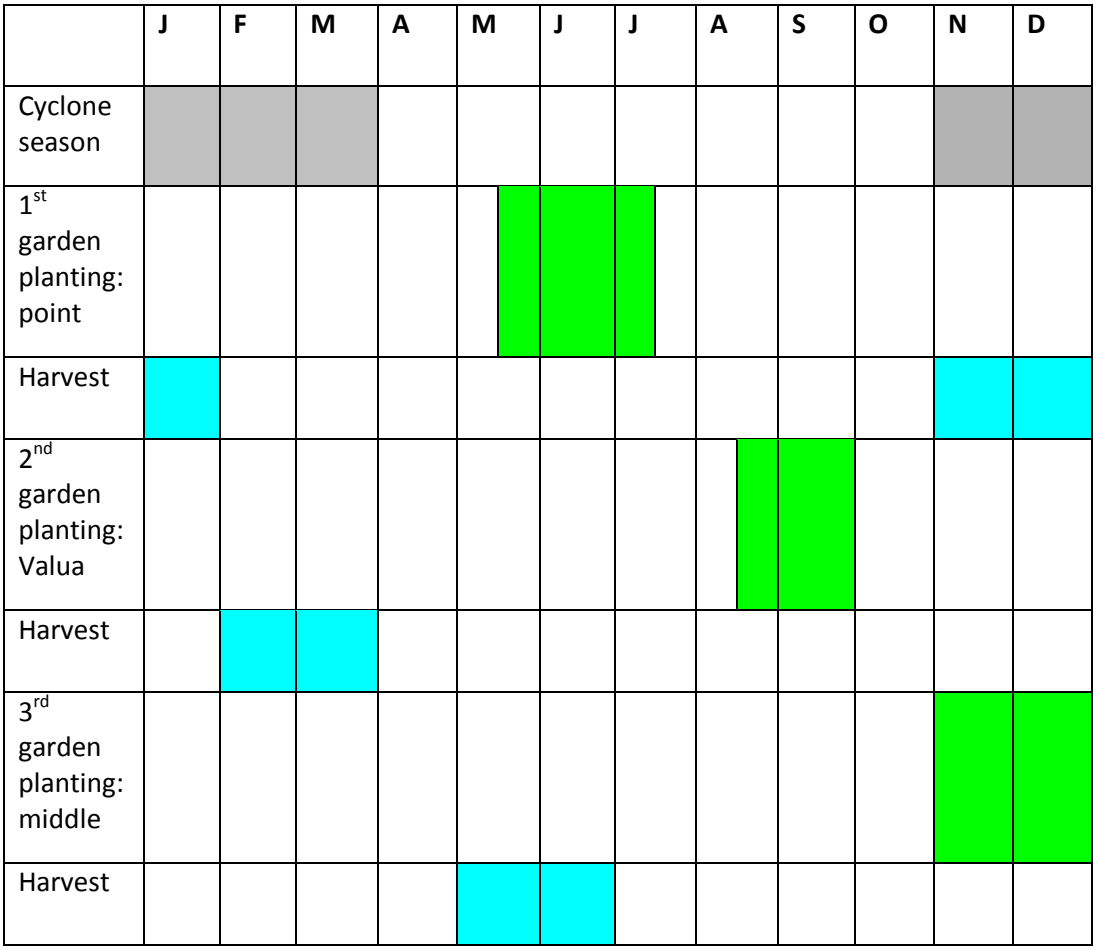

Figure 27 Traditional agricultural calendar. Green indicates the first garden stage yam planting periods, and blue indicates the main yam harvest. Yam was continuously harvested following these main harvest periods as a mix of varieties were planted and some take up to nine months to mature. The most common variety takes six months, hence these major harvest periods

The yam crop that traditionally produced the highest yield was that planted on the point (or commonly at other locations) during the dryer months of May, June and July. This 'main' crop was particularly important for buffering food production against cyclone damage – participants likened this crop to 'disaster insurance'. This is because, as shown in Figure 28, the majority of yams reach maturity by November and December. This insures against cyclone damage in two ways. Firstly, the majority of yams will remain undamaged if a cyclone occurs because the crop will have reached maturity. This is especially the case if the cyclone occurs during January and February – the most common months of occurrence. Following the cyclone the yams can be harvested and consumed and stored. Secondly, mature yams can be harvested and stored prior to a cyclone

occurring, provided a cyclone does not occur in October or November (a rare occurrence). This is rarely practiced now since the practice of harvesting and storing a surplus has fallen into disuse. In addition to yams, a good proportion of the annual taro crop would be mature by December, meaning it was better able to withstand cyclone conditions.

A crop planted during November and December (commonly in the middle), is also fairly cyclone resilient since the vines are still very young and small. Vines will generally recover and continue to grow following a cyclone and the crop can be harvested as normal from May and June the following year. The crop that is most susceptible to cyclone damage is that planted at Valua in August and September. This is because yams are not reaching maturity until February or March, meaning that although the vine is well established, the tubers are not mature during the majority of cyclone season. If a cyclone occurs, the majority of the crop is likely to be lost. This was the case for many households following Cyclone Wendy which occurred in February of 1972. In this case, participants explained that the November/December harvest would generally see them through (in terms of food and planting stock) until the next harvest in May/June. Purposeful vulnerability reduction tools become particularly important in this circumstance, to fill these gaps in 'normal' production.

The practice of following this agricultural calendar is declining in the community and this was a major concern identified by participants. It makes sense that a declining prevalence of yam would reduce the necessity of following this traditional calendar. However, participants stressed that although yam is declining in prevalence, some amount of it is still planted by most households and that this remains an important vulnerability reduction tool.

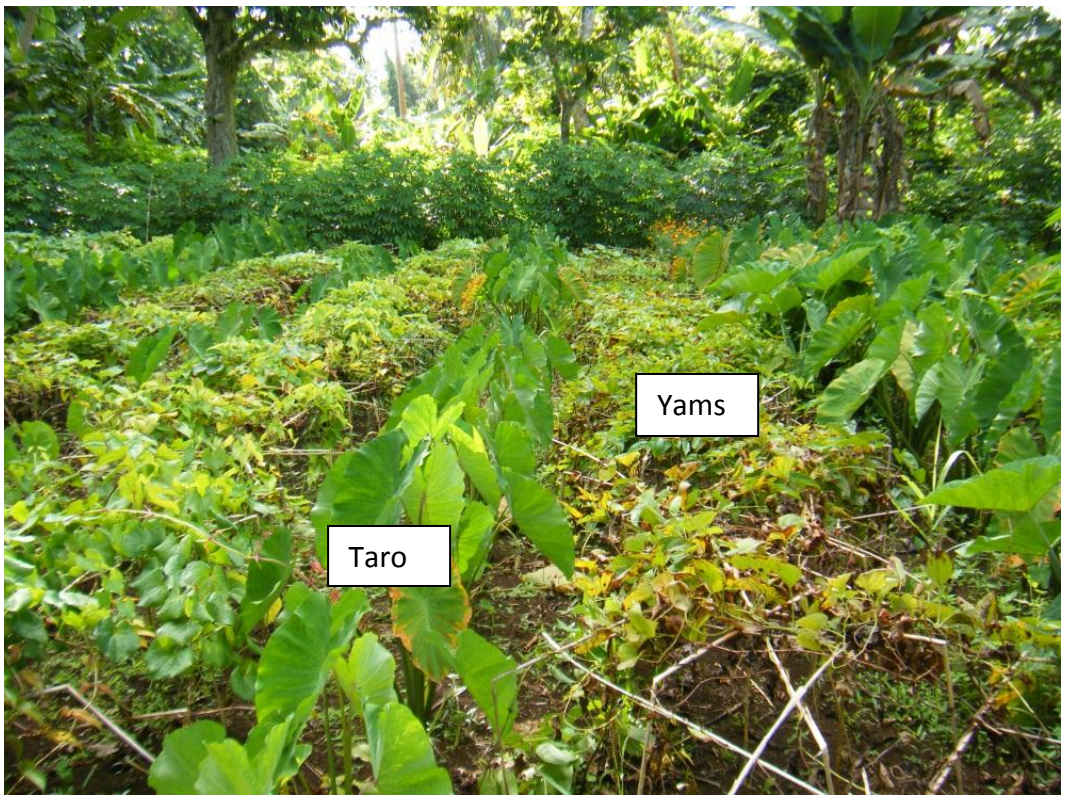

Figure 12 Yams reaching maturing. Note yellowing 'dry' leaves. I took this photograph in November

Participants recognised that the loss of the traditional planting calendar was a major reason for food shortages following Cyclone Funa (January) as the majority of households had not planted at a 'cyclone resilient' time of year. Paul emphasised that:

> We face disaster now because we have lost the planting in the kastom months! We didn't plant in May and June, so yam wasn't ready in January when Funa came.
>
> *So people planted yam in which months?*
>
> All about! Most don't have planting months now. That's why disaster caused so much trouble because people didn't prepare! If they had prepared like the grandfathers before, they would have been ok. But they didn't.

Participants recognised that agriculture and society in general was changing and that this reduced the relevance of many of the traditional tools such as the

generation of a large yam surplus discussed above. However, planting yam in 'cyclone resilient' months was something that most participants believed remained feasible and relevant. Indeed, many older participants that I *storianed* with still followed the traditional calendar and were therefore minimally impacted by Cyclone Funa. Participants were generally concerned that younger people did not have the knowledge – and reverence for the knowledge – to continue the practice. In this context, I asked Carl:

> *Do plenty of people hold tight to the old calendar?*

He responded:

> No! Before, our old people had much wisdom about planting but now they are dead! They passed on some of the knowledge from before, but they passed it to some of us only. I have some knowledge because I *storianed* a lot with my grandfather but he is dead now. But plenty of other old people kept the knowledge to themselves. *Kastom* was there, but they didn't want to share with the younger people. That's why plenty of us haven't got knowledge of the kastom months to plant.

Many were concerned that knowledge such as the *kastom* planting months was being swiftly lost with successive generations as a result of an increasing communication gap between older and younger generations (Chapter Four, Section 4.3.2).

5.6 Purposeful tools

I now move to a description of vulnerability reduction tools that are purposeful. These are mechanisms, both traditional and contemporary, that are consciously employed above and beyond 'normal' livelihood activities in order to reduce the specific food insecurity risks associated with climate stress. Purposeful vulnerability reduction tools are largely those employed to cope with 'contingencies' – to ensure food is available even when climate buffered

agricultural systems fail. Although my discussion is in the context of tropical cyclones, the majority of these tools are employed to cope with other types of climate (or other) stress that create troughs in 'normal' agricultural production. Participants attributed a decline in many purposeful tools to changing vulnerability reduction priorities and the expectation of external resource flows.

5.6.1 *Kaekae blong hangri*

Kaekae blong hangri is the *Bislama* expression for 'famine food'. This is food that will only be processed and eaten in times of extreme hardship either because it is arduous and time consuming to process, or because it tastes very bad. More often than not, *kaekae blong hangri* has both of these attributes. Campbell (2006: 18) classifies land-based famine foods in the Pacific as including:

a) Wild plants given rudimentary agricultural attention,

b) Plants obtained from natural forest, and,

c) The setting aside of land for cultivation but for use only during emergency conditions.

I add a further category:

d) Plants normally cultivated but processed or used in a different way during *desasta* conditions.

Table 13 contains the major famine food varieties identified by participants in my research in accordance with this classification.

Table 13 The most important varieties of *kaekae blong hangri* identified by participants. In italics are the local names in Mota Lava language or *Bislama* if indicated.

Name and description	**Classification (categories as above)**	**Application**
Nemyah or Wild taro/Giant taro (Alocasia macrorhiza): a wild growing variety of taro found along river	a	Still utilized although not common. Eaten in the months following Cyclone Funa for the first time in many years.

banks. Sometimes planted in these areas (Figure 29)		Requires treatment to make it edible
Nasñan: A tuber similar to sweet potato found growing in the bush	b	No longer utilized. Eaten last after the cyclone in 1939
Nayap: A root that is soaked in seawater and processed to remove toxins and made into laplap. Grows in coastal areas (Figure 30)	b	No longer utilized. Older participants recalled their parents processing *Nayap* following the cyclone in 1939 but did not know how to process it themselves
Notomag tibele: A wild growing variety of *wovile* (*Bislama*)	b	Still utilized opportunistically
Natangura (*Bislama*) (Metroxylon sp.) starch or sago palm starch: edible starch is extracted from the sago palm by splitting the stem, draining the liquid and drying to extract the starch which is then made into laplap. Lengthy process	d	No longer utilized. Older participants recalled stories their grandparents had told them about how to process *natangura* starch. According to Campbell (1990) 1910 was the last time sago starch was used as a famine food on Mota Lava. However, according to Mota Lavan participants and key informants from the Torba Provincial headquarters, communities on neighbouring Ureparapara reportedly ate *natangura* starch following Cyclone Funa due to severe food shortages
Feral manioc: starch is extracted from wild-growing manioc tubers which are inedible prior to processing due to old age	a	No longer utilized although starch is sometimes extracted from old cultivated plants found in gardening areas left to fallow. Some varieties of manioc grew wild in the bush prior to its major introduction to gardens in 1939. Forest cover protected plants from cyclone damage.
‘‘wild yam’’: see Section 5.6.2 below. These varieties of yam grow wild in the bush but are sustained by replanting practices when harvested. They are also purposefully cultivated in areas of family-owned bush.	a and c	Commonly utilized, although the practice of purposefully planting ‘wild yam’ in areas of bush is declining. Important food source following Cyclone Funa

Dried breadfruit: see Section 5.6.3 below	d	Still processed although mainly for general consumption. Important food source following the cyclone in 1939 and to a lesser extent, 1972.
Fermented breadfruit and taro: breadfruit and taro can be preserved through fermentation	d	No longer utilized. Campbell (1985) identifies fermentation as a traditional famine food, however, participants in my research on Mota Lava did not identify this. Fermentation was discussed by elderly participants in my other case studies however, although knowledge of how to ferment has been lost. Key informants from the Vanuatu Cultural Centre confirmed that crop fermentation occurred in the Banks Islands until approximately the 1930s.

Figure 29 *Nemyah* or wild taro

This list of *kaekae blong hangri* varieties is by no means exhaustive. There are hundreds of famine foods traditionally gathered from the bush and coastal areas that have seen generations through times of food shortage. The varieties contained in Table 13 are those that participants have processed and consumed themselves during their life time, remember their parents processing during their child hood, or have heard stories about from their parents or grandparents. Much knowledge of most *kaekae blong hangri* has been lost – an issue of

particular concern to participants of all ages. The majority of *kaekae blong hangri* varieties outlined in Table 13 are no longer consumed, however, they are varieties about which participants believed enough knowledge existed to revive the practices, if required.

Figure 30 *Nayap*

Participants identified that over the past century, the presence of imported food, disaster relief and other external resource flows have reduced the need for *kaekae blong hangri*. Introduced crop varieties also reduce the need as there are now more fast-growing species (such as *kumala,* manioc and corn) than in the *taem bifo*. Despite this, participants in my research frequently discussed the importance of reviving knowledge and incentives for traditional famine food production. This is a consequence of food shortages following Cyclone Funa – of the 'wake up call' provided by a lack of access to sufficient imports and relief to fill the troughs in regular food production.

Participants perceived *kaekae blong hangri* to be something that was potentially valuable as part of a contemporary adaptive toolbox, particularly if climatic conditions become more variable and uncertain. While Weightman (1989) observes that it is unlikely that communities will ever need to resort entirely to traditional famine foods because of introduced crops and disaster relief, through

local eyes, retaining and reviving knowledge of these is nonetheless important. Knowledge of *kaekae blong hangri* – and incentive to *utilize* the knowledge – is fundamental to self-reliance in dealing with climate stress. Rapid loss of this knowledge, observed by all participants in my research, is therefore of great concern to Mota Lavans and a priority to address in initiatives for CBA. I now examine two famine foods identified as particularly important by participants. 'Wild yam' and dried breadfruit are both traditional mechanisms that have particular relevance to vulnerability reduction in the contemporary situation.

5.6.2 'Wild yams'

Wild yams'[100] have already been mentioned a number of times in previous chapters and sections. 'Wild yams' are the most significant *kaekae blong hangri* utilized by the Mota Lava community in the contemporary situation. The consumption of 'wild yams' during times of low garden production is one of the most important traditional and contemporary vulnerability reduction tools on Mota Lava. In the *taem bifo* (and to an extent, contemporarily), use of 'wild yams' extended beyond climate stress-related shortage periods and was a staple during annual periods of low garden production such as August.

Sustaining a significant 'wild yam' stock is an integral vulnerability reduction tool on Mota Lava, both traditionally and in the contemporary situation. Varieties of 'wild yam' are extremely environmentally resilient and will withstand any type of extreme or abnormal weather. They withstand cyclones, droughts and extreme rainfall with little damage. Thus, 'wild yams' are one of the most important means of ensuring food security in times of climate stress and low garden production (source: local participants). Participants recalled utilizing these following the two major and numerous minor cyclones during the 1900's. This resource was also integral to food security during the not infrequent periods of

[100] According to Weightman (1989), common species of 'wild yam' in Vanuatu are, *D. nummularia, D. Bulbifera* (arieal tubers) and *D. pentaphylla*.

drought, in particular the severe droughts of 1988, 1997 and 2003. At the time of my fieldwork in October/ November 2008, 'wild yams' were a staple of most local diets. At least fifty percent of my meals contained 'wild yam' in some form[101].

'Wild yam' is the local term for varieties of yam that are not cultivated in established garden areas and that are not generally consumed on a day to day basis. In addition to culturally significant varieties of yams cultivated in established garden areas, 'wild yam' varieties form an important component of Mota Lava's agricultural system. 'Wild yams' are generally utilized as 'back up' food – to supplement, or form the basis of, consumption during periods of low established garden output. 'Wild yams' do not have the cultural value of 'regular' varieties of yam and are generally only eaten when there is little else available because of a grainy texture and bitter taste.

The phrase 'wild yam' does not only mean literally 'wild' growing, non-cultivated yams, although this is the most common form. Varieties of 'wild yam' are also cultivated in particular areas of family owned (as opposed to common property) bush (different areas to bush gardens) (see Figure 31) and in marginal soil areas such as coconut plantations. In this form, 'wild yams' will be planted and then left without clearing or maintenance (category 'c', as defined in the previous section). Unlike 'regular' yam varieties 'wild yam' requires little or no regular maintenance once planted and does not require highly fertile soil. Thus, there are two ways of accessing 'wild yams' to consume in times of shortage: searching for and gathering non-cultivated 'wild yams' from common property[102], primary bush areas, and; harvesting cultivated 'wild yams' from pre-planted family bush

[101] This was because the family I lived with maintained 'wild yam' bush areas. Not all households had such an abundance of 'wild yam', as is discussed below.

[102] This is not the case for all primary bush land – some has *kastom* owners. Due to a certain loss of ancestry knowledge, the ownership structure of much of the primary bush land is unclear.

areas. Both ways require proactive management to ensure a sufficient resource for *kaekae blong hangri*.

Participants voiced concern that mechanisms for ensuring sustainable quantities of 'wild yams' in preparation for climate stress are increasingly less effective than in the *taem bifo*. This was highlighted by Cyclone Funa – many households did not have access to sufficient quantities of 'wild yams' to fulfil their consumption needs, thus contributing to the food shortage. This was because of declining stocks of both non-cultivated and cultivated 'wild yam'.

Figure 31 A cultivated 'wild yam' area (photograph taken in south Santo). Vines are commonly trained onto young trees and specially placed poles or bamboo.

Non-cultivated 'wild yams' are an important common property resource. Non-cultivated 'wild yams' were an important food source following Cyclone Funa and continued to be at the time of my research nine months later. Sustaining these non-cultivated stocks is dependent upon local common property resource management practices. Because of the rudimentary agricultural attention non-

cultivated 'wild yams' receive, they fall into category 'a' as identified in the previous section. There are ways of harvesting tubers without removing the *'stamba'* or main stem of the plant, thus enabling the plant to continue to produce tubers. Where the *stamba* is removed, re-planting immediately following the harvest of a 'wild yam' plant prevents the resource from becoming depleted. This is a simple process – the 'head' of the main tuber is removed and buried close to a standing tree. However, this is commonly no longer practiced and as a result, non-cultivated stocks are declining. Paul explained to me that:

> It's not like before, because now, people dig them up, but then don't bury them back again. Now we don't have very much 'wild yam' in the bush. Too many people have gone and dug them out and not planted them back again. That's why we are short – there's nothing to re-grow again.

When questioned why these seemingly simple practices were declining, participants responded that it was a product of changing values. Specifically, participants identified an increasing sense of individualism and a decrease in social cohesion in society and culture as a key cause.

Depletion of non-cultivated 'wild yam' stocks was compounded following Cyclone Funa. In response to the realised shortages in common property bush areas (and to a degree, in response to recommendations by the agricultural extension officer from the Torba Province) the community harvested tubers to transplant in coconut plantations and (to a lesser extent) bush gardens. However, sustainable harvesting practices were not followed. I asked Paul:

> *Why didn't people re-plant again after harvesting, like they used to?*
>
> I don't know! I think they are just lazy or maybe they don't know about the ways of planting back again. If you dig without pulling out the *stamba* it's hard, but if you just pull the *stamba* it's easy but they

> don't grow back again. It think that's why. They are lazy and they don't care about spoiling it for other people. Selfish.

Many participants emphasised the role that chiefs should play in ensuring sustainable practices in non-cultivated 'wild yam' harvest. However, most identified decreasingly effective leadership and loss of *rispek* for chiefs to limit this – particularly because of a lack of policing. John explained:

> Chiefs now, should stop this [unsustainable harvesting practices]. But it is hard because the chiefs today are not the same as the chiefs before. Before, if you took a *stamba*, the chief would fine you because the yams belong to the whole community, not just you. But now there are no fines – the chiefs do it too.

Participants attributed this mentality to a move towards increasing individualism and away from 'traditional' collectivism with increasing capitalism. Many participants believed that the importance of maintaining common property resources, and knowledge of traditional resource management practices had not been instilled in the younger generations because of the decline in *kastom* teaching institutions.

Traditionally, community leaders or 'chiefs' played a central role in ensuring and maintaining common property resource management practices, in particular through placing harvesting *tambus* on high demand or short supply resources. With the changing structures of *rispek* for community leaders, initiatives to maintain common property resources have been largely ineffective in recent years. Up until the 1980's, *tambu* provided rules for the social regulation of 'wild yam' use. Participants recalled a collective community effort to repopulate the bush with 'wild yam' in the late 1960's. Harvesting of certain areas was prohibited for long periods (five to ten years) unless climatic or other stress necessitated it. Participants recalled that following Cyclone Wendy in 1972, the *tambu* was lifted for six months. Simon recalled:

> After Wendy came, I went to the bush with my mother. I was a small boy. The chiefs allowed us to dig 'wild yam' again. I walked about with my mother to go dig the [wild] yam, and they were big ones! Plenty of food! Because they had been in the ground for a long time. Now it's different. Now they are just small because they are not in the ground for very long before they are dug up.

Many participants noted this – when the *tambu* was in place, 'wild yams' were harvested only when absolutely necessary and were therefore large. In the absence of the *tambu* however, they are harvested more frequently and are not left to reach full size.

The result is that non-cultivated 'wild yam' stocks are becoming depleted and 'wild yam' is far less common in the bush than in the *taem bifo*. All participants believed that the effects of a severe cyclone (such as Wendy in 1972) would be far greater today than in the past due to the loss of 'wild yam' stocks. Following Cyclone Wendy there was an abundance of 'wild yam' that participant's parents had planted. However, following Cyclone Funa (and during a drought in 2003), although many households went to the bush to look for 'wild yam' there were few plants to be found. The lack of robust common property 'wild yam' reserves was therefore a major factor compounding food shortages in the months following Cyclone Funa. Coupled with this, few households had maintained cultivated 'wild yam' areas prior to the cyclone. According to participants, if households had maintained cultivated 'wild yam' areas, food shortages would have been far less severe.

Traditionally, large stocks of 'wild yams' were planted in family bush areas in preparation for times of shortage. Planting 'wild yam' bush areas is a fundamental mechanism of vulnerability reduction. Older participants maintain areas of cultivated 'wild yam', in the bush and within coconut plantations – many linked this to *wan pikinini wan karen* because these gardens were an important source of low labour food reserves when there are many mouths to feed.

However, these participants noted that younger households, in particular, were no longer doing this. Most believed this trend to have begun around 1980. Younger participants explained that their grandfathers had taught them how to make a 'wild yam' garden but that they did not maintain one. Following Cyclone Funa, many younger households relied on their parents' 'wild yam' stocks – another aspect of the decline in *wan pikinini, wan karen*. Increases in theft also play a major role in reducing incentives to plant 'wild yam' areas. In the context of *desasta*, some participants discussed a lack of 'wild yam' as a cause rather than an outcome of theft being primarily a product of laziness. Cyclone Funa highlighted the problem of lack of 'wild yam' as theft increased significantly following the cyclone as many households were unable to meet their own food consumption needs from their own households' resources.

Many participants noted that Cyclone Funa had revived interest in establishing 'wild yam' bush areas, as given the social changes, common property resources could no longer be relied upon to be sustainable. However, as outlined above, unsustainable harvest of non-cultivated stock in order to create these gardens compromises this resource, making the efficacy of this initiative questionable.

5.6.3 Food preservation: dried breadfruit

In addition to gathering and cultivating famine foods, traditional practices for preserving food met consumption needs in times of shortage. Participants in my research discussed one practice at length: that of drying breadfruit in preparation for times of food shortage. The consumption of dried breadfruit, alongside consumption of 'wild yam' was frequently referenced as one of the most important explicit traditional vulnerability reduction strategies. This is because it was a fundamental strategy for coping with food production contingencies until relatively recently. Although dried breadfruit is still processed in small amounts, it is not produced in enough quantity, or by enough households, to effectively perform this function. However, participants perceive

dried breadfruit to have great relevance as a contemporary vulnerability mechanism and therefore, as an important practice to retain and revive.

As a practice traditionally engaged in purposefully for reducing vulnerability to environmental uncertainty, dried breadfruit has now taken on socio-cultural value. This has been the key to its continuation – dried breadfruit tastes good and is now occasionally processed for general consumption and sale within the community. As a practice associated with the Banks islands and in particular with Mota Lava, there is some sense of pride and identity associated with this aspect of *kastom*. During my fieldwork I participated in processing a few dried breadfruit that I took back to Port Vila with me and delivered to the Vanuatu Cultural Centre's museum at the community's request. Unlike many aspects of traditional vulnerability reduction, dried breadfruit is a practice that is contemporarily revered – largely because of its economic value within the community. However, it no longer serves a vulnerability reduction function and many participants were concerned that younger generations are losing knowledge of how to process it.

There are many varieties of breadfruit found on Mota Lava and according to local participants, over fifteen of these varieties are traditionally used for drying. Breadfruit is gathered from trees surrounding established garden plots and within settlement areas. Like other tree crops, breadfruit trees have their own specific ownership and inheritance structure, different from that of land. Currently, most households have access to at least one or two trees. Breadfruit is a dietary staple during its two annual seasons. In the past, dried breadfruit processing was an important annual household activity during the two seasons (particularly in November/December season, which is the largest crop). More breadfruit was produced than needed for day to day consumption and the substantial surplus was dedicated to preservation. This is a time consuming process undertaken over a number of weeks (see Figure 32).

In the past, this activity was a regular seasonal feature of the agricultural livelihood cycle undertaken by every household. The bulk of the processing was undertaken by women. According to older participants, although this was a period of intense labour, it was approached as something of a social event with extended family groups coming together to share labour. The bulk of dry breadfruit was processed before December, prior to and during the main yam harvest (November to January). Importantly, it needed to be completed before the main part of cyclone season: January to March.

Figure 32 Processing dried breadfruit

If processed correctly, the end product would keep for a number of years, although it would generally be consumed within a year. If food shortages were not experienced over cyclone season, most of the dried breadfruit would generally be incorporated into the normal diet and a new batch would be made the following year. However, participants stressed that in the *taem bifo*, enough dry breadfruit remained in storage, year round, to cope with contingencies. In the *taem bifo*, it was common for up to 200 dried breadfruits to be stored within a unique *kastom* dried 'breadfruit box' at any one time (see Figure 33).

Figure 33 Kastom box for storing dried breadfruit

Dried breadfruit is no longer processed in these quantities, with this regularity, or by this many households. In short, it is no longer processed for the purpose of reducing climate stress-related vulnerability. Participants often discussed the loss of this vulnerability reduction tool in the context of changing risk perceptions and the changing priority of vulnerability reduction mechanisms within the community. Instead of processing and storing breadfruit when it comes into season, it is commonly consumed in the form of *nalot*, a type of *laplap* with reduced coconut cream on top – a local delicacy. Making large batches of *nalot* (commonly for fundraisers and lafets) may have replaced the social function that making dried breadfruit use to serve – women often come together and share labour to produce *nalot*[103]. Older participants stated that during breadfruit season, fresh breadfruit is now relied upon as a dietary staple far more than in the *taem bifo.*

[103] Although the presence of large traditional wooden 'plates' and *laplap* knives suggest that *nalot* has always been important, socially.

Although dried breadfruit is still processed, it is common for only a few households in the community to do it in a year. Rose explained:

> Now we make it, but not with the thinking of preserving food for a disaster. If everyone made it – that would be good, but the problem that we face is that not everyone makes it. If a disaster comes, we don't have it! Because a few people make it only and the other trouble is, we like the taste too much! Everyone likes to eat it – now, if you hear that one of your relatives has made dried breadfruit, you go and carry it back to your house and eat it!

Dried breadfruit is seldom rationed for times of shortage as in the *taem bifo*. Participants stressed the labour intensity of production. Importantly, however, many participants believed that the decline was not due primarily to increased time commitments in the community – most attributed the decline to laez and lack of incentive to engage in the labour.

Many participants stressed the need to reinstate the regular household practice of preparing dried breadfruit. This was largely in response to the unreliable nature of external resource availability following Cyclone Funa. Participants believed that this would be a feasible tool in the contemporary situation – households would not need to produce the same quantity as in the past, thus reducing the labour and time required. If every household had some breadfruit stored, this would add to the range of purposeful strategies available for coping with troughs in agricultural production. This is a good example of a traditional practice where a high level of knowledge and skills remain, but for socio-cultural reasons, the motivation to engage in the practice is declining, particularly among younger generations.

5.6.4 Short term preperation and recovery practices

The tools I discuss here are those undertaken purposefully to directly prepare for, cope with and recover from a cyclone. Traditional tools remain although

participants were concerned about a decline in these. Many participants noted that in the *taem bifo*, precautionary measures would be undertaken each year in preparation for the coming cyclone season such as securing houses, preparing new roofing material, storing water, preparing firewood, cutting down old trees and harvesting certain crops. These practices are decreasing in prevalence in the contemporary situation with many instead waiting for government issued tropical cyclone warning systems before taking any action. Although (assuming a reliable warning system) this is potentially efficient, participants believed that this made the community more vulnerable to cyclones. Participants voiced concern that the overall mentality has changed from self-reliance, to 'psychological dependency'. Michael explained that:

> All dependence is on the outside now. We depend on the help from the government, depend on the warning on the radio. But these things from outside fail a lot of the time. Before, dependence was on us – the old people knew the seasons of the cyclones, they did many things each year to prepare. That was our *kastom*. Now we don't have it. It's no good.

Participants were concerned about the lack of initiative taken by their community to engage in post-event replanting and food recovery practices following Cyclone Funa that would have increased food security in the short and long term.

5.6.4.1 Pre-event food security practices

Participants identified a number of local practices undertaken in immediate preparation for a cyclone that minimise damage to gardens and maximise food availability in the months following. These involve protecting certain crops from wind damage and harvesting certain crops for preservation and storage. A key purpose of these was to enable continued food production in the longer term following a cyclone. Contemporarily, pre-event activities tend to take on a less long-term view and typically involve stocking up on imported food (rice, canned

meat, breakfast crackers) from the store, immediately prior to a forecasted event. The majority of local preparation practices are now contingent upon knowing if, and when, a cyclone will occur and therefore depend largely on cyclone warning systems (see below).

One of the most important preparation mechanisms discussed by participants was cutting manioc foliage prior to cyclone occurrence. This is important as manioc – a staple crop in the contemporary agricultural system – is particularly susceptible to wind damage. If above-ground foliage is cut back tubers will sustain less damage (see Figure 34). Foliage will grow back following the cyclone and the plant will continue its growing cycle. This hinders the growth of the tuber however and so is a loss if strong winds do not occur. Participants identified that in the past – particularly before radio communications were available – manioc foliage was cut every year in December and January, prior to the months of highest cyclone occurrence. Participants identified that this is seldom practiced and now people tend to wait for government warnings before cutting foliage. This can be problematic because as outlined below, these warnings are not always reliable. Furthermore, participants noted that recently, foliage is seldom cut even when warnings are received and subsequently manioc crops are lost. Prior to Cyclone Funa, manioc foliage was not cut and subsequently, most of the crop was destroyed.

Traditionally, mature crops remaining in gardens were swiftly harvested prior to cyclone occurrence (whether this was indicated by traditional or government warning signals). This ensured food supplies in the shorter term (taro, manioc) and longer term (yam) following the cyclone. This is no longer a common practice. When questioned why people no longer commonly cut manioc foliage or harvest mature crops, participants typically responded that people no longer viewed it as important because of the expectation of relief supplies in the short and long term.

Figure 13 Mature manioc foliage

Although a lack of reliable warning systems contributes to this situation, the majority of participants recalled that regardless of received warnings, most households had not undertaken these preparatory actions prior to smaller cyclones experienced over the past two decades. Participants voiced concern about a lack of forward planning with vulnerability reduction. People tend not to plan for food provision in the months following a cyclone and as was demonstrated following Cyclone Funa, this results in delayed food shortage once remaining edible crops have been consumed in the shorter term.

5.6.4.2 Warning signals: traditional and modern

Strong cyclone warning systems (whether these be traditional or modern) are important to minimising damages – to food crops, to housing and to human health and wellbeing. Warning of an impending cyclone enables preparations to be made that minimise vulnerability in the short and long term. Participants were

concerned about the loss of knowledge regarding traditional weather signals indicating an impending cyclone. Older participants identified a wide range of environmental indicators signalling an impending cyclone. The major traditional signals identified were: certain seabirds coming to land; specific changes in the colour of the sky, and; certain changes in wind direction. Younger participants retain little or no knowledge of these. In the *taem bifo*, traditional signals enabled households to make short term preparations to minimise risks and damages. Indeed, many participants recognised the contemporary value of this traditional knowledge in the absence of reliable radio warnings. Participants explained that although knowledge of traditional signals exists, people now wait for government warnings before any preparatory action is taken. Improving government warning systems is important to wellbeing – participants stressed that many traditional indicators were seldom certain, for instance, a cyclone is considered to be more likely with a northerly wind, but not always.

Communication technology and links to Mota Lava – particularly radio signals, the medium of government cyclone warning delivery – are poor and unreliable. Furthermore, government warnings cannot always be accurate. Both of these factors came into play prior to Cyclone Funa. When the initial information was broadcast on Radio Vanuatu two days before the cyclone hit, Mota Lava was not receiving radio reception. Fortunately the telephone was working at this time and information was received in this way via family members living on other islands. However, initial information broadcasts are an advisory of a potential event only and there is seldom certainty at this stage of likely cyclone category and when and where it will make landfall. As such, the broadcast was of potential gale force winds. Radio signals were received sporadically over the next 48 hours, although reception was limited. Accordingly, the community missed the advisories and then the warnings that were issued. Confusion ensued as to what was the correct information – the community understood that a storm was forecast but that this would have gale force winds only and would not significantly affect the Banks Islands. This situation was exacerbated by the fact

that not every household has access to a working radio and there was no community-based committee or organisation responsible for disseminating disaster information. Some households received warning information a few hours before the cyclone struck although participants stated that this broadcast advised that the cyclone had already bypassed Mota Lava. Due – in part – to a lack of clarity of information received, few preparations were made and damages to gardens were significant.

Participants noted that much traditional knowledge regarding extreme weather indicators had been lost and this was primarily a product of changing structures of *rispek* and traditional education in the community. Participants were concerned about an over reliance on government issued warnings as these are not always accessible or reliable. Although participants identified the improvement of government issued warnings to be paramount in reducing vulnerability, many believed traditional warning signals retained much contemporary value since these often enabled longer-term preparations to be made such as harvesting yam crops. Participants often discussed this in the context of declining self-sufficiency and 'psychological dependency'. In the days prior to Cyclone Funa, older participants explained that many had noted environmental signals but that few had taken preparatory actions in response.

5.6.4.3 Post-event food security measures

A number of purposeful vulnerability reduction practices following a cyclone are fundamental to food security – both in the immediate weeks and months following the event but also in the longer term. A distinct lack of engagement in these by many households in the community was a major factor contributing to widespread food insecurity in the months following Cyclone Funa. Participants emphasised that much of the food insecurity experienced following Funa could have been offset if post-event practices had been maintained.

Participants noted that following Cyclone Funa, many households did not return to the gardens to begin the process of clearing and replanting for one to two

months. Traditionally, people returned to the gardens as soon as possible following a cyclone to clear debris, harvest and salvage edible crops and begin post-cyclone replanting activities. Harvesting mature yams for storage was particularly important as this would provide a sustained supply of food in the months ahead. Harvesting damaged crops such as taro and manioc and gathering fallen bananas and other fruit was also important for food security in the short term. Some participants had done this following Cyclone Funa and as a result did not face severe food shortages. However, the majority of households did not return to the gardens immediately, instead eating remaining rice supplies and waiting for relief shipments (source: local participants). The consequence was that crops rotted in the ground and potential food sources were lost. Participants noted that this had also been common following Cyclone Wendy in 1972. Kenneth explained:

> After Wendy, the rice came and we ate rice. Ok. Now we must plant the garden back again. After the cyclone, we didn't go to the garden a lot. We just looked around for food. One, two months, now we go to check the gardens and clear the wood. Its a lot of work.

The difference however, was that external resource flows at this time were enough to adequately sustain food security until crops were replanted and reached maturity. Participants noted that following Cyclone Funa, many people only began returning to the gardens when it became evident that relief would not be forthcoming and food shortages became severe, thus extending the period of food insecurity.

Pro-active systems of replanting are fundamental to ensuring food supplies in the months following a cyclone. Participants noted that some contemporary crops are useful in this regard as they tend to be faster growing than most traditional crops – *kumala*, corn and *taro viti* are now commonly planted following a cyclone. *Kumala* and corn take two to three months to mature and *taro viti* five months. Indeed, a large amount of *kumala* was planted following

Cyclone Funa and this continued to be a dietary staple nine months later during my fieldwork. *Kumala* does not require fertile soil or high labour inputs, making it particularly useful in this regard. At the time of my fieldwork, nine months following the cyclone, vast quantities of *kumala* were planted in seemingly every available space. It was common to see *kumala* planted within the village area surrounding houses (Figure 35) which, according to local participants, was an uncommon practice due to increased malaria risk. *Kumala* planting was not particularly pro-active – most households did not plant it until approximately three or four months following the cyclone when severe food shortages became evident.

Figure 35 *Kumala* planted within the village area

Participants relayed that 'best practice' was to replant gardens immediately with a mix of fast and slow maturing crops so as to stagger harvest. Based on stories their parents had told them, participants explained that this had occurred following the cyclone in 1939 and to a lesser degree in 1972. This is potentially easier in the contemporary situation because of introduced crop varieties –while

kumala takes three months to mature, *taro viti* takes five or six months, *aelan taro* and some varieties of yam take six months, and manioc and banana take nine to twelve months. Following Cyclone Funa, however, the majority of households did not engage in this practice, planting fast growing *kumala*, corn, water melon, and *aelan kabbis* only. Replanting with longer maturing varieties came much later, thus extending the period of shortage. It is important to note that this did not apply to everyone – older participants in particular did not experience severe food shortages. John explained that following Cyclone Funa:

> I went straight to the garden after the cyclone finished. Ok, I looked. I saw that my yam was spoiled, so I cleared all the wood away and cleared. Then I planted *kumala* with *taro viti* behind, so that when the kumala was finished, I had normal food coming on.

The consequences of widespread delays in harvesting and replanting a) eliminate an important short term food source and b) significantly extended the recovery period. Participants noted that many households were still rationing food at the time of my fieldwork and rationing often disproportionately affects women.

5.7 Summary

In this chapter I have used case study material to illustrate the way in which local ni-Vanuatu communities conceptualise their own climate-centred vulnerability. I have outlined the consequences of the social processes outlined in Chapter Four for vulnerability to tropical cyclones. To do this, I have illustrated changes to the adaptive toolbox that limited the ability of Mota Lavans to deal effectively with Cyclone Funa in January, 2008.

It is evident that climate stress unveils a multitude of underlying social stresses that manifest in a particular way when climate stress – such as a tropical cyclone – is encountered. Communities are clearly cognisant of the fact that 'vulnerability' is something reaching far beyond direct causes, being a product of wider processes of social change. Communities themselves understand that

vulnerability to cyclones cannot be neatly separated from broader social problems and concerns and that attempting a 'chain of explanation' makes little sense.

To summarise local perspectives outlined in this chapter, vulnerability to climate variability and extremes in increasing. Traditional vulnerability reduction tools were both incidental and purposeful, enabling the community to deal with a highly uncertain environment. The traditional adaptive toolbox buffered agricultural livelihoods against marginal climatic conditions by allowing for contingencies. A number of these tools are being rapidly lost, largely because of reduced socio-cultural incentives for their continuation. As the community becomes more dependent on external resource flows in 'normal' times, so are they becoming reliant on these in times of climate stress, when agricultural food production troughs. Widespread food shortages following Cyclone Funa highlighted the importance of improved self-reliance, as external resource flows were not sufficient to ensure food security. Participants emphasised the importance of sustaining and adapting many traditional vulnerability reduction tools. Their recent experiences have illustrated that knowledge can be lost in a matter of one or two generations.

This chapter, and the last, are a platform for local voices. They reflect, as accurately as possible, the way in which the Mota Lava community portrayed their own situation with regard to dealing with environmental uncertainty. In writing this chapter however, I do not wish to portray the situation as overly negative or a 'doomsday scenario'. While 'vulnerability' is the framing concept, I emphasise that a great deal of adaptive capacity and resilience exists. Climate stress and environmental uncertainty in general is something communities in Vanuatu have dealt with 'forever' and as such, robust mechanisms for minimising the impacts of this on wellbeing exist. While I have repeatedly discussed a decline or loss in many of the traditional means of reducing vulnerability (as these are the issues of concern to the community), the fact remains that these

strategies still exist and/or have been adapted to suit changing situations. Although the community highlights decreasing self-sufficiency in dealing with climate stress, participants emphasised that the community would always find a way to deal with periods of climate stress and move on. A strong toolbox remains. An important pathway for CBA in this context is to maintain and build upon this foundation of social resilience, increasing capacity for local innovation and flexibility.

CHAPTER 6

Synthesis: Effective community-based adaptation in Pacific Island countries?

6.1 Introduction

This chapter brings together local constructions of vulnerability on Mota Lava with constructions prevalent in the mainstream international adaptation discourse. In Chapter Two I outlined the mainstream international adaptation discourse, and in particular, focused on the dominant conceptual framework of climate change vulnerability underpinning it. In Chapter Three, I considered the ways in which this dominant conceptual framework commonly translates into assessment frameworks for CBA, outlining limitations I encountered in applying these frameworks in Vanuatu. In Chapters Four and Five, I characterised and documented local community constructions of vulnerability in the context of climate stress on Mota Lava.

In this chapter I synthesise these analyses in order to shed light on my overall research question: **to what extent does the mainstream international adaptation discourse enable effective community-based adaptation in Pacific island countries?** This chapter builds upon the conceptual analysis in Chapter Two. Drawing on local voices I critically evaluate the mainstream international adaptation discourse (research objective one[104]). This synthesis allows an appraisal of the extent to which CBA 'theory' could be achieved in 'practice' in

[104] 'To critically evaluate the mainstream international adaptation discourse, in particular its conceptual framework of vulnerability'.

rural Vanuatu using insights from the case study of the Mota Lava community (research objective three[105]).

I begin by discussing the broad types of activities that would constitute effective CBA for Mota Lava, based on local constructions of the problem. I then consider the extent to which these types of activities could be achieved under the mainstream vulnerability-adaptation complex which is based on overly scientific constructions of the climate change problem. Finally, I place these issues in the Pacific region. Given global 'imaginings' of the region as marginal and fragile – both historic and related to climate change specifically – the prevailing climate change vulnerability and adaptation discourse has specific implications for the delivery of effective CBA in PICs.

6.2 What is 'effective CBA' in the case of Mota Lava?

My field-based research examined local perceptions of vulnerability to climate stress in the context of climate change. For reasons outlined in Chapter Three I did not attempt to identify specific adaptation strategies, actions or plans with participants. My intention was to increase the 'audibility' of local voices at a national policy and planning scale in Vanuatu. This was achieved through characterisation and documentation of locally-perceived factors and processes causing vulnerability at the local scale. Rather than identifying specific strategies for addressing climate change on Mota Lava therefore, my field-based research informs the broad types of activities that would address local priorities, increase self-reliance, and 'help people to help themselves' in adapting to climate change. In other words, I identify the broad types of activities that would enable effective CBA, in line with CBA theory, on Mota Lava. I do not presume to identify specific CBA actions or measures for Mota Lava, but rather to suggest broad trajectories for effective CBA in Vanuatu, based on local conceptualisations of vulnerability.

[105] 'To evaluate the theory of CBA and critically appraise the extent to which it is applied in CBA implementation'.

6.2.1 Local constructions of 'nature', 'culture', climate stress and vulnerability on Mota Lava

To ascertain an effective trajectory for CBA in Mota Lava I begin by distilling insights from Chapters Four and Five to characterise local perceptions of vulnerability on Mota Lava. In local perceptions, climate stress and climate change are a social, rather than environmental, problem. The nature of vulnerability and resilience to climate stress on Mota Lava is grounded firmly in factors and processes indirectly related to climate stress. In *storian,* participants primarily framed climate-centred vulnerability as an outcome of the social, cultural, economic and political factors and processes outlined in the yellow and outer layers of Mota Lava's NVD (see page 156), rather than as an outcome of merely climatic or environmental processes. Through local eyes therefore, vulnerability to climate stress is primarily a product of 'non-climate' factors and processes.

As found by Reid and Vogel (2006), climate stress, when it occurs, 'unveils' a range of other development-related stresses such as poor access to services, restricted access to land, conflict, or disease. In Mota Lava (and much of rural Vanuatu in general), climate stress unveils stresses such as: loss of traditional knowledge and culture; reduced community leadership capacity and cohesion; less sustainable subsistence agricultural production; increasing import and aid dependency; limited capacity to participate in the market economy; limited access to external services and information; population growth, and; limited provincial government capacity to address local concerns. *Storian* regarding experiences of cyclones (and other climate stresses) invariably came quickly around to a discussion of socio-cultural change, socio-economic problems and the implications of these 'non-climate' factors in shaping vulnerability to the climate stress itself.

Local cultural frames on Mota Lava do not regard climate stresses and uncertainties as a 'force of nature' that departs from 'normality'. As discussed in

Chapter Five, dealing with environmental uncertainty is – and has been over generations – an ingrained part of social, cultural and livelihood systems, institutions and practices in Vanuatu and the wider Pacific (see also Campbell, 1990; 2006; Mercer et al., 2007; Barnett and Campbell, 2010). Participants generally discussed climate 'stresses' as an ordinary and expected part of the yearly cycles of life. Many identified that cyclones, although causing disruption, also provide beneficial services such as improving soil fertility and 'cleaning the village'. That 'hazards shape culture' is often overshadowed by the prevailing human ecology perspective that 'culture shapes hazards' in vulnerability studies (Bankoff, 2001). Rather, as stated by Oliver-Smith (2004: 20):

> If disasters cannot be defined exclusively in natural or social science terms, they may, perhaps, be seen more productively as a mode of disclosure of how the interpenetration and mutuality of nature and society…are worked out.

My research indicates that ni-Vanuatu frames of thinking position 'nature' or 'the environment' as ontologically integrated with society, culture, economics and politics. This way of thinking differs from the dichotomies inherent in Western thought. In Pacific Island societies, 'the environment' constitutes culture, identity, economy and politics (Barnett and Campbell, 2010). Thus, the *impacts* of 'natural' climatic events – cyclones and droughts – were not generally portrayed in *storian* as distinct or separate to socio-cultural systems. Rather, participants portrayed climate-related stresses as closely integrated with, or part of, the stresses, concerns and opportunities of everyday life and livelihoods. Indeed biophysical processes such as tropical cyclones or droughts are recognised as 'ordinary' features of society.

Heijmans (2009) contends that despite the vulnerability paradigm in disasters research, the prevailing view of disaster 'experts' (whether explicit or implicit) is that disasters are caused by "…external events caused by nature" (Heijmans, 2009: 6), reflecting a Western perspective. In contrast, participants in my

research viewed *desasta* as being caused primarily by social, cultural, economic and political phenomena – in particular, arising from rapid socio-cultural change – rather than environmental or 'natural' phenomena[106]. As is also identified by Wisner (2004: 186), participants in my research viewed *desasta* as "extensions of the problems faced in 'normal' or 'daily' life". Through their eyes, there is little separation between the risks, stresses and problems arising from everyday life and livelihoods, and vulnerability to specific biophysical climate stresses (see also Allen, 2003; Lavell, 2004; Wisner, 2004). Addressing the problems faced in everyday life therefore, is synonymous with reducing vulnerability to climate stress in local perceptions.

Climate-related stress was not generally portrayed in storian as a 'priority concern'. Any discussion of the impacts and implications of climate stresses themselves tended to be brief and superficial; participants did not generally frame exposure to cyclones or droughts and their immediate impacts as major threats or priority concerns[107]. Participants tended to discuss the direct impacts of cyclones, droughts and other climate-related stresses in a 'light-hearted'

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[106] The exception to this portrayal was a participant who had been involved for many years with national civil defence as part of the police force. This participant framed cyclones as a significant departure from the stresses and concerns faced in daily life, as an unexpected 'natural' event causing severe disruption and requiring external assistance.

[107] As is discussed in Chapter Three, this is also likely to be a product of the dominant research approach in vulnerability research, based on the nature/culture dichotomy inherent in Western frames of thinking; beginning with the 'event-centred' stresses and working back towards the 'everyday', 'non-climate' stresses underpinning them. Given that 'nature' and 'society' are not ontologically separate for ni-Vanuatu, talking about climate stresses as distinct entities and climate impacts as discrete happenings – largely taken for granted in Western thought – may not make much sense. Although I became aware of local perspectives though the course of the research, I could not completely escape my own Western dualistic perspective. Although the *storian* technique helped to mitigate this as much as possible, the research structure remained centred around an analysis of climate events.

manner, even sometimes displaying disinterest in discussing them[108]. In saying this, I do not wish to suggest that climate stresses do not cause considerable disruption. The community identified significant impacts to wellbeing caused by Cyclone Funa and viewed climate stress as an increasing threat – particularly given the prospect of increases in the scale of problems faced due to climate change. However, these problems, although problematic, are generally considered part of 'normal' life and something to be endured and overcome in due course (see also the findings of Berkes and Jolly, 2001). Other community problems take precedence through local eyes — problems that the community live with on a day-to-day basis. For the most part, these other problems intersect with the social factors and processes underpinning vulnerability to climate stresses.

In comparison to climate stresses themselves, the 'non-climate' stresses underpinning vulnerability to climate events (such as socio-cultural change, population growth, land use change, and limited access to markets) *were* perceived as a priority concern. These 'non-climate' stresses are of priority concern to the community irrespective of climate stress. 'Non-climate' concerns were discussed in-depth and at length in storian because they are perceived to have wider reaching implications for wellbeing than climate-related problems. 'Non-climate' stresses are an everyday concern because they limit the ability of the community to meet their own 'development goals', such as their ability to meet their own needs, exercise their rights and maintain their values (see Barnett and Campbell, 2010). 'Non-climate' stresses are restricting the ability of

[108] This was more the case in the Tangoa Island and Mangalilu/Lelepa Island communities than in the Mota Lava community, probably influence by the fact that a cyclone, drought or other climate event had not been recently experienced in these communities. Nonetheless, although participants in the Mota Lava community were still experiencing the effects of Cyclone Funa at the time of my research, the biophysical event itself – and previous events – were seldom the focus of *storian* and participants preferred to discuss the underlying causes of impacts.

the Mota Lava community to: retain and obtain what is culturally and socially valuable to them; secure stable and sustainable livelihoods; meet their material, cultural and social needs and aspirations, and; generally lead the lives they want to live, on their own terms. Importantly, participants predominantly articulated their 'development goals' as cultural rather than economic or material. They expressed a desire to retain, revive and effectively live within *kastom* in a contemporary world. It may be that while climate-related problems are (currently) expected, 'familiar' and (fairly) straightforward to address at the community scale, problems of a socio-economic and socio-cultural nature may be less familiar and straightforward to address, making them more worrisome. In addition to cultural constructions of nature and climate impacts, two factors seemed to influence the apparent low priority of climate-related stress (in comparison to 'non-climate' stress) on Mota Lava. These are that: a) the community has not experienced a high magnitude, physically disruptive cyclone or severe drought for some years, influencing this risk perception, and; b) the community does not currently live in a marginal environment characterised by high exposure to climate stress, low ability to cope and therefore extreme impacts on wellbeing. In much of the literature regarding local scale and starting-point vulnerability, communities in question face extreme socio-economic deprivation and marginalisation, forcing them to inhabit marginal and risky environments (e.g. O'Keefe et al., 1976; Pelling, 1999; Allen, 2003; Lavell, 2004; Wisner et al., 2004; Schipper and Pelling, 2006). In 2009 I visited a community in the Bagherhat District in the southwest coastal region of Bangladesh. In this community, social and political marginalisation has left people with little choice but to inhabit fast eroding, resource poor and unproductive land that is highly exposed to salinity, flooding, tidal surges and tropical cyclones. Extreme poverty and low social mobility underpinned an inability to cope or adapt to environmental stresses. Cyclone Sidr in November of 2007 resulted in widespread loss of life, livelihoods, housing and food security. The biophysical environment occupied by people on Mota Lava cannot be described similarly as

'marginal' or exposed and the losses experienced are comparatively less catastrophic[109]. It may be the case that many communities living in the Bagherhat District of Bangladesh, or in other biophysically marginal environments, would perceive direct climate-related stresses as a higher priority concern[110]. However, it is widely recognised in the literature that the 'non-climate' stresses of everyday life commonly take precedence in local people's perceptions, even where losses resulting from climate events are high (van Aalst et al., 2008).

Participants in my research were fully cognisant of the "nested" nature of local vulnerability (Smit and Wandel, 2006: 286). They were aware of the ways in which distant, structural factors and processes influenced and shaped many local problems, both climate-related and 'non-climate' related. In terms of event-centred vulnerability, structural processes were identified in *storian* as the primary and underlying causes of reduced 'choice' in responding to climate stress, in terms of both: a) reductions in traditional vulnerability mechanisms, and; b) limited effective contemporary vulnerability mechanisms. To use the parlance of the PAR model, the Mota Lava community have a comprehensive awareness and understanding of the 'root causes' and 'dynamic pressures' that create 'unsafe conditions' and therefore shape their vulnerability in the context of climate stress (Wisner et al., 2004). A participant from Mangaliliu village aptly attributed many problems in the community to "*fosis blong global*" ("global forces"/"globalisation") and particular consequences of these in the village context.

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[109] Despite the lower urgency of vulnerability reduction, proactive and anticipatory adaptation is nonetheless very necessary in situations like Mota Lava to prevent environements becoming marginal to the point where people are highly exposed. This is discussed in Chapter Seven.

[110] This is conjecture only. I refer to my observations of communities in the Bagherhat District as an illustration only. I conducted no research in these communities.

The decline in many traditional vulnerability reduction mechanisms and changes to the broader socio-cultural framework underpinning them was consistently linked to processes outside direct community control: Western cultural and economic ideologies; globalisation; market integration; local history; national education system; international aid availability and delivery; national and rural development planning; global food prices; access to external markets, resources, services and knowledge; and inter-island transport provision. Participants articulated their vulnerability as 'contextual' (see O'Brien et al., 2009). They recognised that these distant and indirect causes of event-centred vulnerability are interwoven, creating local situations which (on the whole) increase vulnerability to climate stress. Problems arising from climate stress were rarely portrayed in *storian* as having linear or direct 'chains of explanation', but rather as arising from the broad context of everyday life (see also Pelling, 1999; Wisner et al., 2004).

That vulnerability to climate stress is a political ecological problem, situated within the broader political economy of development, is clearly comprehended by the Mota Lava community, albeit not in that particular language. The way in which local people themselves view their vulnerability reflects the 'vulnerability paradigm' in disasters research. For example, *desastas* are deemed to be primarily *social*, as opposed to *'natural'* happenings. 'Nature' and 'culture' are mutually constitutive. 'Culture' constructs 'nature'/climate stress as a fairly normal part of society. By the same token, 'nature'/climate stress (as an independent entity) has constructed local 'culture' and society. Indeed mechanisms to reduce vulnerability to climate stress on Mota Lava are ingrained and often 'incidental', parts of 'culture' (see also Berkes and Jolly, 2001). The prevailing view of participants in my research was that vulnerability reduction is becoming 'unravelled' from the structures, institutions, practices, and worldviews underpinning everyday life.

Mota Lavans perceive climate-related stress as arising from what Blaikie and Brookfield, (1987) refer to as the 'on-going social order'. However, participants also constructed a 'non-human', independent biophysical causality in *desasta*, despite this not being represented as extra-ordinary to the regular local social, cultural, economic and political cycles of life. Given this, local people perceive potential increases in the scale of current climate stresses to be of particular concern, recognising that these may exceed capacity to respond effectively. Many participants voiced concern about a 'bigger' cyclone than Cyclone Funa happening in the future, particularly given that the increasing separation of vulnerability reduction from local society and culture is reducing capacity to respond effectively to current climate stresses.

It is important to note that although the political ecology/economy literature commonly labels the effects of wider structural processes on local people as 'marginalisation', participants did not generally perceive themselves in this way. Case studies in the literature are commonly those in which communities face extreme poverty, 'underdevelopment' and social or ethnic exclusion (e.g. Susman et al., 1983; Adger and Brooks, 2003; Winchester et al., 2007). For example, in the Philippines, Allen (2003) identifies communities displaced because of military clashes to be particularly socially marginalised, resource and cash poor, and therefore vulnerable to typhoons. Also in the Philippines, Heijmans (2004) discusses communities left out of development decisions to the extent that their entire basis of livelihood is destroyed by state imposed 'modernisation' projects. Participants in my research did not perceive themselves as poor, under-developed, or excluded in the same ways by wider structural forces. Although participants expressed concerns regarding food security into the future, Mota Lava (like most of rural Vanuatu) retains a fairly stable subsistence economy with strong social networks that (largely) override

the cash economy, preventing extreme poverty or deprivation (Regenvanu, 2009)[111]. 'Poverty' is culturally relative (Wallace, 2009).

Relative 'isolation' from the main centre of power (Efate) was the only factor explicitly referenced by participants as generating feelings of exclusion. In *storian*, Torba was frequently (and often jokingly) referred to as the 'forgotten province'. Because of distance from Efate, limited infrastructure, limited communications and expensive transport links, islands in Torba are excluded from many government and non-government services and aid projects, and lack strong political representation within central government. Mota Lavans recognise that limited access to remote resources and decision-making processes has contributed to vulnerability throughout history and in the contemporary situation. Despite this recognition, however, participants did not generally portray themselves as feeling ostracised, excluded or particularly underprivileged by 'isolation'. Indeed, many discussed the merits of distance, perceiving themselves as better off than communities on Efate where rapid economic development processes have created social problems and limited access to land for many. In this sense, distance from the locus of national power may well contribute positively to adaptive capacity in rural Vanuatu. The processes, causes and implications of marginalisation may be less detrimental to wellbeing in Mota Lava than in parts of the Philippines or Bangladesh, for example, where more immediate ethnic and political marginalisation has more harmful physical and psychological consequences.

In saying this, I am not suggesting that Mota Lava is *not* marginalised. As discussed below, Pacific communities are marginalised in regional and international adaptation efforts in that the mainstream discourse excludes their

[111] Vanuatu's NAPA explicitly notes that 'poverty' is not a directly relevant term in Vanuatu, as although rural communities may not possess financial capital, subsistence affluence and social networks provide basic needs (Government of Vanuatu, 2007b).

voices and capacities. Local knowledge, values and priorities are largely excluded from regional 'development' processes which are formed and implemented within primarily Western frameworks and cultural norms (see Bankoff, 2001; Regenvanu, 2005; Wallace, 2009). Ideologies driving dominant regional development paradigms are based on Western capitalism which disadvantages 'smallness' and 'isolation', particularly in the absence of regulation.

As a community outsider from a Western culture, I can observe – through my own particular cultural, academic and political lens – that many of the locally desired benefits of 'Western' or capitalist-economic development do not reach Vanuatu and Mota Lava in particular, due largely to their 'isolation' (like healthcare, electricity, telecommunications, transport infrastructure, education and certain material goods[112]). I can also observe that the majority of community-identified factors constraining the ability to meet 'development goals' are explicitly or (more often) implicitly, a consequence of imperial and neo-colonial devaluation of traditional knowledge and culture. However, in the same way that Hau'ofa (1993) argues that smallness is state of mind, 'marginalisation' can also be viewed as a state of mind. In highlighting the political ecology of vulnerability on Mota Lava and in the wider Pacific, I do not wish to impose a disempowering 'marginalisation discourse' on Mota Lava, downplaying local socio-cultural autonomy and agency.

6.2.2 The role of traditional knowledge in resilience and adaptive capacity

As is established in Chapters Four and Five, processes of socio-cultural change underlie much of vulnerability to climate in Vanuatu. Participants in my research consistently emphasised the rapid loss of traditional knowledge as one of the most challenging and pervasive community problems. Through local eyes, a loss of traditional knowledge is one of the most prominent factors threatening

[112] These are items that participants identified as lacking and necessary to contemporary wellbeing.

resilience and compromising adaptive capacity on Mota Lava. Declining traditional knowledge is reducing the ability to flexibly and effectively respond to environmental uncertainty. The role and meaning of traditional knowledge in the context of adaptive capacity requires some attention, since this was an important issue highlighted by participants.

In much of the research and literature regarding traditional climate knowledge, traditional knowledge is often treated in a 'superficial' way. By this, I mean consideration of traditional knowledge is often restricted to specific 'countable', static knowledge (including skills and practices). For example, the documentation of indigenous observations of changes in environment and climate variables is common, particularly to highlight the tangible impacts of climate change on 'at risk' people (e.g. Percival, 2008). Many community-based assessments focus on traditional knowledge in as far as this extends to local and traditional *strategies* for coping with current climate stresses (e.g. Nyong et al., 2007). This documentation and assessment is important and useful in CBA, particularly to give voice to indigenous people's knowledge alongside Western science and to harness existing capacity in place-specific ways (Kelman, et al., 2009).

What is often lacking is consideration of the role of deeper, underlying, less 'countable' knowledge systems that (re)generate the specific knowledge, skills and practices important to vulnerability reduction. This is what I refer to as the 'social apparatus' – the socio-cultural framework that hold specific skills and practices in place. In other words, the culture, values and worldviews that underpin the ability to deal with uncertain environments are largely overlooked in climate change adaptation research. A common pitfall is that traditional knowledge is treated as "… just another information set from which data can be extracted to plug into scientific frameworks" (Berkes, 2008: 164; see also Bravo, 2009). This is the approach taken by the IPCC in their (brief) treatment of traditional knowledge: " … the inclusion of … indigenous knowledge to complement more formal technical understanding generated through scientific

research …" (Yohe et al., 2007: 832). In my interactions with climate change adaptation researchers and practitioners in the Pacific region I have frequently observed the perspective that traditional knowledge has limited use and application in adaptation, since 'old' strategies for coping with climate stress will not necessary hold up with increased variability and extremes. This reflects a limited understanding of traditional knowledge, overlooking the underlying social apparatus that enables the development, evolution and flexibility of indigenous strategies for adaptation to climate stress.

Berkes (2008) questions the extent to which indigenous *epistemologies* are incorporated in dominant climate change research. Berkes and Jolly (2001) and Berkes (2008) look beyond static 'knowledge', to underlying processes of 'knowing' in the Canadian Arctic. Their conceptual framework of traditional knowledge in relation to living with an uncertain environment resonates with my research findings in Vanuatu[113]. Berkes and Jolly (2001) distinguish between shorter-term and longer-term response strategies that enable communities to adjust to changing environmental conditions. Shorter-term 'coping strategies' are particular knowledge, skills and practices employed to minimize risks, such as harvest timing, harvest locations and species selection. However, the effectiveness and adaptability of these strategies is sustained by a cultural frame that allows the generation and regeneration of this specific knowledge. The ability to learn and adjust coping strategies to suit changing conditions is dependent upon traditional cultural ways of perceiving, understanding and

[113] Despite having extremely different societies and ecosystems, Arctic and Pacific communities face many of the same challenges with climate change in that: both environments are biophysically uncertain and variable; both societies are facing rapid social and cultural change, and; both regions are commonly symbolised as 'canaries in the coalmine' in climate crisis discourse. They also have in common a wealth of indigenous capacity for dealing with their environments, based on generations of experience. The similarities in challenges and opportunities related to climate change between Arctic and Small island nations are recognised in the Many Strong Voices programme (Many Strong Voices, 2010).

intuitively interpreting environmental conditions (Berkes, 2008; see also Ford et al., 2007). This is based in a particular cultural value system and its related social institutions such as: harvesting what is available and acting opportunistically; sharing mechanisms and social networks, and; high value placed on environmental competence. These are the longer-term adaptive strategies. These engender flexibility and innovation in generating and regenerating the specific coping strategies themselves. In other words, these are the basis of adaptive capacity and resilience.

Over generations, longer-term socio-cultural systems on Mota Lava have enabled shorter-term mechanisms to develop and evolve in ways suitable to the social and biophysical context. Mota Lava's socio-cultural apparatus has provided flexibility in coping with, and adapting to, climate stresses and uncertainties. Longer-term response strategies reflect aspects of *kastom*: systems of *rispek*; strong work ethic; planning for the future; strong community leadership, and; social learning institutions structuring knowledge dissemination. Chapter Five outlines the many purposeful and incidental mechanisms employed – contemporarily and traditionally – to deal with climate variability and extremes. However, as is outlined in Chapter Four, Mota Lavans attribute much of the perceived increase in vulnerability to underlying changes to socio-cultural apparatus and worldview.

As emphasized by Barnett (2001: 10), in the context of climate change and PICs: "an integral feature of resilient systems is an ability to learn from, and reorganize to meet, changed conditions". In my research, participants overwhelmingly emphasised an erosion in community resilience or the ability to reorganise to meet changed conditions (although see Section 6.4.3 below). As the case of Mota Lava's food insecurity following Cyclone Funa illustrates, returning to an acceptable state following environmental perturbation is perceived to be slower and less effective than in the past. Socio-cultural change and a growing dependence upon external resources in dealing with climate stress has reduced

the regeneration of traditional vulnerability-reduction mechanisms or generation of contemporary ones. This is not to say that the traditional toolbox and related skill set is not being 'topped up' with modern iterations of knowledge and practice. For instance, methods of agro-forestry and intercropping introduced by the provincial agriculture officer are being employed by some to increase garden productivity. However, changes to the amount and structure of traditional knowledge dissemination within the community means the adaptive toolbox is decreasing in size, sustainability and flexibility. There is concern that over time, knowledge and practices themselves will be lost, further reducing capacity to deal with environmental uncertainty.

While high dependence on external resource flows provide important and indispensable safety nets reducing the potential for catastrophe, this dependence may come at the expense of aspects of endogenous flexibility, local innovation, and self-reliance in the face of a highly variable and uncertain future climate (Paulson, 1993). Incentives to maintain, build upon and engage traditional knowledge are lessened. This is an issue compounded by the implicit devaluation of traditional knowledge by (among other historical factors) the formal education system (see also Regenvanu, 2005). Importantly, most participants identified that much traditional knowledge still existed. The problem was lack of incentives for particular knowledge to be engaged in practice and passed on to younger generations. As the case of Cyclone Funa illustrated, external resource flows are not always reliable in the outer islands. What is particularly concerning is that climate change potentially adds a new level of environmental uncertainty to the equation, increasing the importance of self-reliance and flexibility.

6.2.2.1 'Loss of kastom': a home-grown despondency theory?

It is important to recognise that the notion of *kastom* is enmeshed in discourse. By highlighting the political ecology of vulnerability on Mota Lava I do not wish to suggest 'cultural instability'. It is evident that wider structural ideological

'development' processes have influenced rapid socio-cultural change. I do not want to suggest however, that Mota Lavans are 'malleable', 'powerless' and 'unable to resist' these 'strong', 'powerful' and 'imposing' forces. Sahlins (1999) refers to such a viewpoint as a 'despondency theory' – discursive assumptions that 'Western' cultures and economic systems have the ability to destroy 'tradition', culture, agency and history, producing an image of indigenous peoples as 'weak victims'. While recognising that the Western world-system is domineering and even violent, Sahlins cautions against losing sight of indigenous peoples' agency in narratives of Western cultural hegemony (Sahlins, 1999). Rather, Sahlins (1999) argues that the dichotomy between 'tradition' and 'modern' is unstable, fluid and changing.

In the context of Melanesia, Spriggs (1997: 283) emphasises that "…a static traditional society never existed, except as a fantasy of early twentieth-century anthropologists and sociologists". Societies and their cultures are by nature dynamic and constantly changing and social change is inevitable and should not be assumed to be negative. Social and environmental change influenced and shaped by external forces has been a constant feature of Pacific societies throughout history. Indeed, Europeans were not the first 'outsiders' responded to by Melanesian societies (Spriggs, 1997).

The fact remains, however, that participants in my research consistently reiterated 'loss of *kastom*' – culture and traditional knowledge – as the root of most community problems, including increasing vulnerability to climate change. The concept of *kastom* has been socially constructed (at the national and local scale) in a political context in Vanuatu and has become imbued with cultural meanings of identity.

Kastom is a political concept that has evolved over time in Vanuatu (particularly post-independence) to basically indicate "essential differences between Ni-Vanuatu and the West" (Larcom, 1990: 175). Larcom (1990) makes the observation that at both the national and local scale, the socially constructed

meaning of *kastom* has changed from transferable *commodity* (e.g. artefacts, techniques, songs, dances) to *culture* in the anthropological sense. *Kastom* became something of a 'political category' leading up to independence from the British-French condominium (1980) as an expression of ni-Vanuatu solidarity (Tonkinson, 1982; MacClancy, 2002). Regenvanu (2005: 4) states that by this time, *kastom* had taken on notions of "symbolism of indigenous identity in contrast to the western forms espoused and supported by the colonial regime, and. . . a force uniting all indigenous people in opposition to non-indigenes". At this time, the notion of *kastom* symbolically united disparate groups.

It may be that the concept of *kastom* in the eyes of Ni-Vanuatu has arisen from the context of perceived threat from a cultural 'other' and as such, has specific connotations of something to be 'fought for' (such as occurred during the Santo rebellion or 'Coconut War' of 1980, the closest Vanuatu came to civil war) or, contemporarily, something to be protected and revived – for instance "the year of the *kastom* economy" promoted by the Vanuatu Cultural Centre. *Kastom* appears to have become a reified phenomenon.

In contrast to the fluid, flexible and evolving nature of culture discussed by Sahlins' (1999), participants in my research firmly portrayed *kastom* as declining and as incompatible with modernisation and capitalism. This indicates a home-grown despondency theory. Given its political meaning, it may be that 'loss of *kastom*' has become a catch-cause of most community problems. Spriggs (1997: 284), however, argues that Melanesian

> 'custom', although legitimised by appeal to an idealized past, is as much a modern construct as parliamentary democracy or saluting the national flag. It is reworked, re-evaluated, and reinvented every day, just as it always has been every day for the last 40, 0000 years.

Sahlins (1999) recognises that 'culture' is commonly reified as societies become increasingly 'self-conscious' in response to political pressures.

6.2.3 Effective CBA is effective community development on Mota Lava

Although I have suggested that the Mota Lava community do not view climate stress or climate change as a priority concern I do not mean to imply that climate change is irrelevant, or that adaptation to it is not necessary. However, as Barnett and Campbell (2010: 22) state:

> . . . because many Pacific Island communities do not see themselves as ontologically separate from nature in any possible way, actual or impending changes in 'environmental' elements mean quite different things to local people than they do to outsiders.

What constitutes an effective approach to adaptation, therefore, is likely to be perceived differently by local and 'outside' or 'expert' actors, who draw their understandings primarily from mainstream international adaptation policy discourse.

The community on Mota Lava perceive their ability to effectively deal with current climate variability and extremes to be declining because of a raft of social 'development-related' problems. These development-related problems are a priority to address for the community, both because they cause vulnerability to climate change and because they affect wellbeing in general. *Desasta* is a product of primarily social processes. Reducing vulnerability to climate change therefore, primarily requires addressing community 'development goals'. As stated by Barnett and Campbell (2010: 137): "Solutions will only have traction when they are integrated with existing community concerns, values, needs and aspirations". Importantly, climate change is likely to increase the magnitude and frequency and/or change the nature of current climate stresses faced, thus potentially compounding the social problems. Although communities in Vanuatu have effectively lived with climatic variability and extremes over time, climate change potentially increases the scale of these challenges. The implications of climate stress may become of greater concern to the community in the future if adaptation does not take place. Climate change may create new or exacerbated

climate-related problems that are less 'familiar' or 'straightforward' to address than is currently perceived. Nonetheless, climate change is one factor among many contributing to vulnerability (see also O'Brien and St. Clair, 2007; O'Brien et al., 2009), and this needs to be recognised if adaptation to climate change is to have effective and meaningful outcomes at the community scale.

According to its theory, effective CBA addresses local priorities, empowers, builds upon local knowledge and capacity and increases self-reliance in dealing with uncertain current and future climates. Achieving these principals on Mota Lava clearly requires development processes to address the 'non-climate' factors and processes that the community identify as at the foundation of their vulnerability to climate stress. The types of activities that would engender effective adaptation through local eyes, for the most part, fall at the "vulnerability focus" end of McGray et al. 's (2007) adaptation continuum (Chapter Two, Section 2.2). At this end, the drivers of vulnerability are addressed with activities "largely indiscernible from general development" (McGray et al., 2007: 18), and specific climate change concerns are rarely incorporated. In other words, adaptation *is* development, rather than being entirely additional to it.

To enable the Mota Lava community to effectively adjust to, and deal with, an increasingly uncertain climate, CBA needs to advance both shorter-term and longer-term response strategies (Berkes and Jolly, 2001; Berkes, 2008). In other words, CBA needs to address not only direct factors influencing vulnerability to climate stresses (e.g. decline in 'wild yam' availability), but underlying indirect and, where feasible, distant factors as well (e.g. loss of traditional knowledge, poor outer-island service provision). In local perceptions, addressing only shorter-term, direct causes is not solving the root causes of increasing vulnerability, not integrating adaptation with community-voiced needs and priorities and is unlikely to equip the community with the flexibility to self-sufficiently tackle increasing climate uncertainty into the future. This is not to say that advancing shorter-term strategies to increase the ability to respond to

specific climate stresses is not helpful or necessary – these are an important part of an adaptation response. However, strengthening the underlying foundation of resilience is ultimately integral to increasing the ability of the community to adjust to changing environmental conditions *in a way that suits them*.

In local perceptions, managing social change is integral to 'helping people to help themselves' in adapting to climate change. Conserving and increasing the perceived value of holistic traditional knowledge systems is an important aspect of this process. Older participants recognised and voiced concern that aspects of traditional knowledge could disappear over one or two generations. The majority of problems identified by participants related in some way to socio-cultural change and a 'psychology of dependence' (Regenvanu, 2005). Participants explained that over-reliance on (unreliable) external resources and aid compromises local agency. Moving towards a 'culture of self-sufficiency' and away from a 'culture of dependency' in livelihoods and vulnerability-reduction is important to effective CBA. In a contemporary world, however, this requires finding a balance between local self-sufficiency in food production and livelihoods, and increasing access to necessary external resources and services. It requires maintaining a degree of continuity in *kastom* through change without losing the things communities' value.

Ni-Vanuatu communities have been dealing with highly variable climates 'forever' and considerable capacity to innovate and adapt to changing social and environmental conditions exists. As suggested by Wisner (2004), however, people's capabilities for self-protection are often extensive and inherent but not used to their fullest extent. Harnessing, maintaining and strengthening this capacity by managing the 'threats' to it (namely, aspects of traditional knowledge loss and socio-cultural change) is an integral and primary part of adaptation to climate change in this context. A large part of adaptation therefore is 'psychological'; a belief in the value of self-capacity and 'ways of doing things'.

In the context of CBA, Dodman et al. (2010) term this psychological element 'capacity to aspire'. 'Psychological adaptation' is empowerment – a central principal in CBA. Regenvanu (2005) contends that cultural disempowerment is one of the most pervasive factors hindering sustainable development in Vanuatu (see also the general discussion by Bankoff, 2001). In the context of the Solomon Islands, Fazey et al. (2010) identify a lack of confidence in local skills and capacity to be a major challenge for community-led problem solving. Strong aid dependency and beliefs that external assistance is required to deal with problems, is a result (in part) of historically top-down rural development. To a degree, a similar situation exists on Mota Lava. The types of activities that would promote psychological adaptation have little or nothing to do directly with climate. Indeed, this may be viewed as more of a 'development' challenge.

Climate change is likely to increase the scale of environmental uncertainty and stresses faced into the future. Rather than requiring entirely additional activities however, climate change increases the imperative and urgency of facilitating effective, community-led development in order that communities can engage their capacity (including to obtain outside capacity where needed), to develop their own adaptive solutions. Schipper (2007: 8) suggests that adaptation be viewed as a "new development paradigm" rather than as discrete, additional activities incorporated into existing development trajectories (which may be the problem in the first place) (see also, Dodman et al., 2010; Storey and Hunter, 2010). The experiences of Mota Lavans suggest that effective CBA in the Pacific ultimately requires 'decolonised' development to reduce vulnerability and to maintain and build upon the local, socio-cultural foundation of resilience.

6.2.3.1 What is effective community development in Vanuatu?

Effective CBA *is* effective community development on Mota Lava. In the main, the types of activities that would help to engender self-reliance in dealing with increasingly uncertain climate are likely to be the same as those that would advance sustainable community development. Schipper (2007: 6) notes that:

> Adaptation to climate change is not as simple as designing projects, drawing up lists of possible adaptation measures and implementing these. It requires a solid development process that will ensure that the factors that create vulnerability are addressed.

What is a 'solid development process' in the outer islands of Vanuatu? Gegeo (2001), Gegeo and Watson-Gegeo (2002), Regenvanu (2005), Slatter (2006) and Wallace (2009) (among others) identify that 'development' itself is precisely the problem, having been the cause of socio-cultural problems, traditional knowledge loss and growing inequality and economic marginalisation in the Pacific. Regenvanu (2005: 4) highlights how periods of missionary influence, colonialism and, contemporarily, globalisation have disempowered ni-Vanuatu communities, creating a "… dependence on what is not of or from ourselves … making us unable to value our own capacities and, by doing so, move towards a truly sustainable national development". Fazey et al. (2010) identify similar processes creating strong aid dependencies among communities in the Kahua region of the Solomon Islands.

Prevailing development paradigms are based on 'Western' knowledge systems, arising from a history of Western investment and aid (Escobar, 1995; Bankoff, 2001). Bankoff (2001) contends that, 'development' itself is a neo-colonial discourse, imposing preconceived notions of societies' needs, aspirations and values. Wallace (2009) and Gegeo and Watson-Gegeo (2002) contend that 'development' in the Pacific continues to be defined by Western standards. Development policies implicitly devalue traditional knowledge systems and local agency, assuming that 'poor' countries are unable to cope without external assistance (Gaillard, 2010). For example, Slatter (2006) identifies exploitation and marginalisation of ni-Vanuatu by the 'development' of the tourism industry in Vanuatu. National investment liberalisation policies (resulting from Asian Development Bank-led structural adjustment during the late 1990's) have created a tourism boom – 'economic development' – but at a social, economic

and environmental cost to ni-Vanuatu citizens to whom few benefits accrue. Firth (2000) and Murray (2001) call the colonial period in the Pacific the 'first wave of globalisation' with the 'second wave of globalisation' since the 1970's creating similar power differentials: "… incorporation into the global economy on terms that suit the interests of the financial markets, the aid donors, and those relatively few Pacific Islanders who are in a position to benefit from the new situation" (Firth, 2000: 192).

Analysing the development literature and prevailing paradigms in the Pacific is beyond the scope of this thesis. I recognise that prevailing development policies have many benefits for Pacific communities in a contemporary world and that obtaining the benefits of capitalist economic development are now part of local needs and aspirations. I also recognise that grassroots development efforts, particularly those implemented by NGOs, are less neo-colonial and more participatory than the broad paradigms discussed above. While the views on development outlined in the previous paragraphs may seem somewhat polemic, they resonate (to a degree) with the experiences of Mota Lavans. In Vanuatu, the most obvious example of contemporary neo-colonial development is the formal education system. Formal education, imbued with Western knowledge and value systems, has played a central role in devaluing and eroding traditional knowledge and limiting opportunities and incentives for its continuation, while being inadequate for ni-Vanuatu to effectively participate in Western economic systems (source: local participants; Regenvanu, 2005). The history of disaster relief provision is another example – while in the past the dominant paradigm was 'relief and recovery', this has now shifted to 'preparation and management' in response to international policy trends (e.g. UNISDR, 2005). Thus, while the Mota Lava community rationally adjusted their vulnerability-reduction behaviour in accordance with a seemingly reliable inflow of external resources during the past century, 'outside' actors 'changed their minds' about what communities *should* be doing. Gaillard (2010) contends that disaster risk reduction itself is

another form of neo-colonial development, regulated and controlled by affluent Western countries.

Although I cannot speak for Mota Lavans, my research and observations whilst living in the community suggest that 'a solid development process' involves increasing the capacity to obtain the external goods, services and knowledge necessary to meet local people's needs, while living within a structure and function of *kastom* suitable and acceptable in their contemporary world[114].

Reducing vulnerability to climate change therefore, is largely contingent upon facilitating development processes that maintain, revive and value *kastom* in a contemporary world – not merely 'countable' aspects but wider pervasive value systems. Regenvanu (2005) emphasises that the contemporary face of *kastom* provides enormous capacities for security and human development although these capacities are threatened by government policies (which, in turn, are structured by regional development strategies and global development paradigms) that "overwhelmingly target ways of increasing money making" Regenvanu (2005: 6-7). Given the relatively low integration of most of rural Vanuatu into the sphere of state governance (and this is particularly the case in the Torba Province), an alternative model of community development capturing local cultural capacity and focussing on social betterment is feasible (Regenvanu, 2005). A postcolonial literature emerging from the Pacific region proposes alternatives to hegemonic regional development trajectories, focussing on issues of identity, incorporating tradition and modernity, and recognising local cultural lifestyles and epistemologies (Gegeo and Watson-Gegeo, 2002; Wallace, 2009).

On Mota Lava, adaptation requires a new development paradigm – a *process* (rather than discrete 'strategies') that is community-led, redistributing power to

[114] This statement is conjecture only. What constitutes effective community development will differ markedly between individuals and groups in the community and researching this would require an entire thesis unto itself.

local actors. As is discussed in the next section however, this is difficult to achieve given the mainstream international adaptation discourse, which perpetuates a conceptualisation of adaptation as discrete activities, additional to development.

6.3 Implications of the mainstream adaptation discourse for CBA implementation

Chapter Two outlined the 'theory' underpinning the emerging discourse of CBA. The vulnerability-led approach to adaptation and the convergent rise of a starting-point interpretation of vulnerability in climate change research has shifted broad emphasis towards vulnerability and away from impacts in adaptation discourse. This 'vulnerability paradigm' forms the broad theoretical base of CBA. It is evident, however, that vulnerability conceptualisations are diverse and at times, divergent within the climate change adaptation field. Although vulnerability is now a central concept in adaptation to climate change, its meaning and relationship to adaptation is by no means agreed upon.

I argue that the way in which vulnerability is dominantly framed in mainstream climate change adaptation discourse is, in many ways, contradictory to the antecedent constructions (particularly in the disasters field) that inspired the impacts-led to vulnerability-led shift in 'thinking about' adaptation. The dominant conceptualisation of vulnerability in the climate change field is reflected in the IPCC compilations. The IPCC definition of vulnerability reflects that of the mainstream - although vulnerability is increasingly viewed as the starting-point of analysis incorporating response capacity, it remains largely based on human ecology and a natural hazards paradigm. This is largely because climate change – and therefore vulnerability 'to it' – is constructed as an inherently scientific environmental problem, rather than a political or development-related problem, in mainstream discourse. Tensions are evident between this conceptualisation in the mainstream international discourse and local constructions of vulnerability on Mota Lava.

6.3.1 Mainstream adaptation discourse: the IPCC and the vulnerability-adaptation complex

The IPCC reports, as scholarly compilations based on a consensus process, reflect mainstream research and practice in the climate change field. Knowledge reflected in the IPCC plays an important role in sustaining mainstream adaptation discourse, particularly that emanating from international policy based around the UNFCCC (Schipper, 2007). The IPCC definition thus both reflects and (re)produces conceptualisations of vulnerability to climate change in the mainstream international adaptation discourse. The concept of vulnerability was first given particular emphasis within the IPCC in the Third Assessment Report (TAR) where the word 'vulnerability' was included in the title of WG2's report (McCarthy et al., 2001). This followed the shift towards emphasis on vulnerability rather than just impacts in climate change adaptation research. The way in which 'vulnerability' to climate change is portrayed by WG2 of the IPCC is reflected in the definition found in the Glossary:

> Vulnerability is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (Parry et al., 2007: 883).

This definition is embodied in a conceptual model of climate change vulnerability developed by Smit and Pilifosova (2003) aimed at practical decision-making (Box 12). The principals of this model (whether explicitly identified or not) reflect the way vulnerability to climate change is commonly construed in climate change research and practice. The model has explicitly formed the basis of a number of place-based vulnerability assessments, including my earlier fieldwork (see Chapter Three) (e.g. Ford and Smit, 2004; Sutherland et al., 2005; Nakalevu et al., 2005).

$$V_{ist} = f(E_{ist}, A_{ist})$$

Where:

V_{ist} = **vulnerability of system i to climate stimulus s in time t**

E_{ist} = **exposure of i to s in t**

A_{ist} = **adaptive capacity of i to deal with s in t**

Box 11 Conceptual model of vulnerability to climate change (Smit and Pilifosova, 2003: 21).

The hazard-specific nature of vulnerability is emphasised. Smit and Pilifosova (2003) contend that it is not logical or feasible to consider physical climatic hazards separately from the characteristics of the system in question, in a climate change research context. The model – outlined in Box 12 – is a pseudo equation – no functional relationship is specified, because it is assumed that the specific relationship between variables will vary in accordance with context, location, sector and community. However, it is assumed that vulnerability is a positive function of exposure and a negative function of adaptive capacity: the greater the exposure the greater the vulnerability and the greater the adaptive capacity the less the vulnerability, all else being equal.

This conceptualisation is often referenced as 'integrated'[115],combining biophysical and social interpretations of vulnerability, because it explicitly includes 'exposure' *and* 'adaptive capacity', thus combining the social

[115] A commonly referenced integrated framework exemplifying the social-biophysical integration is Cutter's (1996) 'hazard of place' framework and Turner et al.,'s (2003) 'place-based' analyses.

characteristics causing vulnerability with exposure to biophysical external stressors (Ford and Smit, 2004; Fussel, 2005; Fussel and Klein, 2006; Smit and Wandel, 2006). Fussel and Klein (2006) refer to this as a 'third way' in vulnerability research that is fairly specific to the climate change, and global change, research communities. For instance, Polsky et al. (2007) propose a framework for integrating different conceptual vulnerability approaches in global change research, reflecting the three dimensions – exposure, sensitivity and adaptive capacity – explicit in the IPCC definition.

Referring to the components of the model in Box 12, Smit and Wandel (2006: 286) contend that "a general conceptual model of vulnerability has emerged in climate change scholarship, similar to the use of the concept more widely". I take the standpoint, however, that the IPCC conceptualisation on which this model is based runs contradictory to many uses of the concept more widely. In particular, I argue that it is counterintuitive to the conceptualisations, traditions and theories that inspired the shift towards vulnerability in adaptation analyses in the first place, in particular the vulnerability paradigm in disasters research.

The IPCC definition adheres to the biophysical exposure-sensitivity framework, as underpinned by the natural hazards paradigm in disasters research and human ecology. It adheres to an 'event-centred' understanding of vulnerability and responses to it. The IPCC definition attributes vulnerability primarily to climate-related biophysical stressors by tying vulnerability to specific climate stimuli – their character, magnitude and rate. Although response capacity is encompassed, adaptive capacity is directly relative to exposure. In the IPCC definition, adaptive capacity is the ability to deal with specific exposures, which brings its meaning close to 'adaptive *strategies*' or even 'coping strategies', as opposed to a broader meaning discussed in the wider literature. In the IPCC conceptualisation and Smit and Pilifosova's (2003) conceptual model, vulnerability is a function of a climate stimuli and the ability to directly respond to it. The IPCC definition (and resultant applications in research and practice)

perpetuate relationship ‘a’ of the vulnerability-adaptation complex (see Chapter Two, Section 2.3) (after Schipper, 2007):

a) Adaptation to climate change impacts reduces vulnerability

The root problem within this dominant conceptualisation is climate change, rather than development-related processes. The implication of this relationship embedded in the IPCC definition, is that vulnerability is related primarily to the impacts of climate variability and change, making it a rather ‘superficial’ phenomenon (Schipper, 2007; Bravo, 2009). The IPCC definition therefore marks a distinct departure from social, starting-point interpretations of vulnerability in the literature derived from the vulnerability paradigm in disasters research (and underpinned by structural and post-structural political economy and political ecology and influenced by constructivism). These social conceptualisations disengage vulnerability from specific external stressors (e.g. Wisner et al., 2004; Adger, 1999; Kelly and Adger, 2000), framing the root problem as existing socio-economic and political conditions that marginalise certain groups, create inequalities, and hamper human agency. Mota Lavans’ constructions of their own vulnerability reflect these social, starting-point interpretations derived from the vulnerability paradigm in disasters research.

Although much of the literature regarding starting-point vulnerability in climate change research discusses vulnerability in the context of wider socio-economic development-related factors, the IPCC definition enables less structural (or post-structural) analysis. Gaillard (2010) observes that the climate change application of vulnerability is outside its original conceptual framework in disaster risk reduction and this is to its detriment. Dependence on climate features, as enshrined in the IPCC definition “takes us a step backward rather than forward”, distracting from the development-related root causes of vulnerability (Gaillard, 2010: 226). Similarly, Bravo (2009: 263) contends that:

> The notion of vulnerability being a relationship of dependence on a particular climate risk is a gross oversimplification and may fail to

speak to the world's most pressing political questions of inequality (see also O'Brien et al., 2009; Liverman, 2009).

The influence of the vulnerability paradigm in disasters research and the resultant progression towards placing 'vulnerability' at the centre of adaptation thinking has brought a number of beneficial features to adaptation, outlined throughout Chapter Two, not least a focus on response capacity. Theory from these traditions however, has yet to fully penetrate dominant adaptation discourse such as that reflected in the IPCC. The WG2 ('Impacts, Adaptation and Vulnerability') Summary for Policymakers (SPM) of the AR4, overwhelmingly emphasises impacts, with no specific section outlining any 'policy relevant findings' regarding vulnerability. Two subsections note very briefly that "sustainable development can reduce vulnerability to climate change …" (IPCC, 2007b: 20), and "vulnerability to climate change can be exacerbated by … other stresses" (IPCC, 2007b: 19). However, in the main, vulnerability is addressed within the SPM in the context of impacts: "adaptation will be necessary to address impacts resulting from the warming …" (IPCC, 2007b: 19), and; "a wide array of adaptation options is available, but more extensive adaptation … is required to reduce vulnerability" (IPCC, 2007b: 19). In this document – directed at policy makers – relationship 'a' of the vulnerability-adaptation complex (see above) is clearly the guiding structure. This may reflect a disconnect between scholarly discussions and policy debates (Schipper, 2009; Gaillard, 2010).

6.3.2 The scientific construction of climate change and vulnerability to it

This section briefly outlines the way in which climate change (and therefore, vulnerability to it) is dominantly socially constructed. In this discussion, I take a critical realist perspective (see Chapter Two, Section 2.4.2.3). Escobar (1998: 53) states: "Although "biodiversity" has concrete biophysical referents, it must be seen as a discursive invention of recent origin". The phrase "biodiversity" in this statement could easily be swapped with "climate change". Although climate

change is a 'real' environmental issue 'out there', the way it is portrayed and responded to is socially constructed, being dependant on social frames[116].

In dominant academic, policy and lay discourse, climate change is constructed as a scientific, global scale environmental problem of atmospheric emissions. The media play a significant role in perpetuating this construction, pitting 'science against science' in debates about the 'truth' of climate change and constructing dramatic 'crisis narratives' (Demerit, 2001; Bravo, 2009). Climate change is portrayed as a problem caused by the build-up of greenhouse gasses in the atmosphere and resultant biophysical hazards. While this is not invalid – climate change *is* created by GHG emissions and this *does* have a global dimension – this portrayal divorces the problem from social and economic structures. There are other ways of formulating the problem "such as the structural imperatives of the capitalist economy driving those emissions, and … poverty and disease" (Demerit, 2001: 313). The scientific construction of the climate change problem is not unfounded, but it is partial.

These issues relate to discourses of impact and response as well as cause. Scientific interpretations of climate change impacts dominate, glossing over the issues of development and inequality which are fundamental to understanding impacts and appropriate response (O'Brien and St. Clair, 2007; Liverman, 2009). Bravo (2009: 259) argues that:

> The grand narrative of climate change impacts is not sufficiently sensitive because. . . it is built exclusively on the language of scientific expertise and physical causation, and is not equipped to deal with politically, economically, legally and socially complex responses.

[116] I recognise that radical constructivist critique of the climate change problem is often criticised for fuelling climate scepticism. This is not my intention here.

Since the primary cause of the climate change problem is 'environmental' in mainstream discourse, it follows that responses to it are portrayed as requiring technical scientific expertise; within this discourse, science is the means of protecting 'culture' from 'nature' (Cass and Pettenger, 2007).

The construction of climate change as an uncertain environmental, rather than political or economic, problem reinforces the perspective that 'nature' (albeit a 'nature' modified by anthropogenic activity) is the primary source of danger. This is reflected in the IPCC definition discussed above where vulnerability is a product of specific 'natural' stimuli (Gaillard, 2010). This discourse is based on the pervasive Western view that science and politics are separated by boundaries. Demerit (2001: 327) explains this binary as a "linear model of upstream science feeding into the downstream policy process … ". The IPCC represents a neutral and objective scientific body whose role it is to feed information into political decision-making processes. The constructed distinction between science and politics, and between fact and value is entrenched in the climate change sphere. Science and politics however, are mutually linked (Forsyth, 2003; Cass and Pettenger, 2007; Demerit, 2001; 2006).

The dominant climate change discourse emphasises biophysical environmental changes as putting communities at risk. I do not debate that biophysical changes exist, or that they create real risks and negative impacts for human communities. However, the dominant discourse constructs climate change as a biophysical environmental, rather than political or moral problem, therefore indicating an apolitical response. Science framing oversimplifies the problem – separating climate change impacts from politics and development.

> The emergence of a dominant discourse about environmental explanation therefore may be based on historic facts and norms of one society, yet lead onto the construction of scientific knowledge about environment "for other locations or societies" that may not be as "factual" as often assumed (Forsyth, 2003: 14).

In this vein, Barnett and Campbell (2010) call for the 'decolonisation' of climate change impacts research in the Pacific region, which hitherto has been dominated by biophysical science studies (see also Kelman and West, 2009).

6.3.3 Vulnerability reduction or impact reduction?

I argue that the dominant conceptualisation of vulnerability and adaptation in mainstream discourse enables climate change *impact reduction*, but limits *vulnerability reduction*. Despite the rise of 'vulnerability' in the adaptation field, dominant international adaptation discourse sustains an event-centred conceptual framework of vulnerability and adaptation, that responds to the actual or expected impacts of climate change, including variability and extremes (Shipper, 2007). Box 13 summarises the key features of the dominant conceptualisation of vulnerability and adaptation.

The dominant construction of vulnerability and adaptation

- Climate change and responses to it are scientific, environmental problems, therefore;
- Adaptation activities are apolitical
- Vulnerability and adaptation are 'event-centred', tied to actual or expected climate impacts
- Adaptation activities are discrete identifiable strategies, and;
- Adaptation activities are complementary, yet additional to, development and disaster risk reduction

Box 12 Key features of the mainstream construction of vulnerability and adaptation in international discourse

Addressing the specific impacts of climate stress and climate change is an important part of adaptation, particularly where climate change impacts will exceed the knowledge, response and innovation capacities of local communities. However, I agree with Schipper (2007), that impacts reduction is 'putting the cart

before the horse', as reducing *vulnerability* (to then minimise the potential for negative impacts) often has little to do with climate itself. This resonates with local views on vulnerability on Mota Lava that essentially frame vulnerability as a political ecological problem, stemming from the political economy of 'development'. Reducing actual or expected climate change impacts *within* this political economy is fairly straightforward; reducing vulnerability by *transforming* it is more difficult.

When the mainstream international discourse translates into funding, practical assessments and implementation projects for adaptation – including in the context of CBA – what typically emerges is activities that focus on discrete 'coping strategies' or specific actions taken to deal with specific impacts of a particular climate stress. To qualify as adaptation, activities need to be tied to particular biophysical climate stresses in some way. In the context of CBA, these activities – while important – are largely reactive responses to existing or 'obvious' climate *impacts* instead of proactive responses to *vulnerability*.

The majority of institutions planning and implementing CBA are NGOs and civil society organisations, with funding coming from a variety of bilateral (e.g. Official Development Assistance) and multilateral (e.g. GEF, World Bank, Adaptation Fund Board) sources. Adaptation to climate change is a relatively new area of work for many of these organisations – indeed, a major task of the First International Conference on CBA (in 2005) was to convince these organisations that adaptation was something that they needed to be doing (Ayers and Huq, 2009). These organisations typically do not have a traditional disciplinary background in climate change research and practice (e.g. Oxfam, The World Wildlife Fund (WWF), The International Federation for Red Cross, Red Crescent Societies (IFRCRCS), Practical Action, World Vision and Tearfund). It therefore makes sense that the mainstream international adaptation discourse – and the IPCC in particular – is where they look to define how to proceed with adaptation: conceptually; in policy, and; practically. This applies to both grassroots NGOs and

large international development and donor agencies[117] (e.g. the Asian Development Bank, UK Department for International Development, AusAID and the World Bank). CBA implementation in communities, is shaped by the worldviews of intervening agencies (both local and international donors) which, in turn, are shaped by the broader international discourse (reflected in international climate change policy) (see also Heijmans, 2009).

It should be noted that many Pacific island governments actively call for material, technical activities in response to frustration with adaptation funding sources (particularly those emanating from the GEF) being constantly directed towards enabling activities and national-level capacity building, which are often not needed (Barnett and Campbell, 2010). The recently established Adaptation Fund provides for this by only funding 'concrete' adaptation measures focused on technology transfer (Adaptation Fund Board, 2010). Although the frustrations of Pacific island governments are certainly valid, a concentration on 'concrete measures' should not come at the expense of continued adaptive capacity building initiatives at a community level – which means something very different to capacity building at a national level.

6.3.3.1 The CBDAMPIC project in the Pacific

I use, as an example, the CBDAMPIC project that implemented sixteen community-based adaptation projects between 2002 and 2005 in the Pacific region, including three in Vanuatu (Nakalevu, 2005). This project was funded by Canadian International Development Assistance (CIDA) and coordinated and executed by SPREP[118].

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[117] This assertion is based, in part, on observations made at the Third International Conference on Community-Based Adaptation in Dhaka, Bangladesh, 2009.

[118] My understanding of this project is drawn from project documents and papers (Phillips, no date; Nakalevu, 2005, Sutherland et al., 2005; Nakalevu, 2006; Barnett and Campbell, 2010) and discussions with key informants in Vanuatu. As I was not involved in the project myself I realise

The basic structure of community-based vulnerability assessment (the CV&A methodology, see Chapter Three) was based around an 'event-centred' conceptual framework (see Figure 15, Chapter Three). This framework reflects the IPCC approach, in particular, the conceptual model outlined in Box 12 above – it is climate-stimulus-specific and exposure-dependent.

I argue that although vulnerability rhetoric was employed in this project, the outcomes of this assessment process were predominantly reactive responses to climate impacts. The outcomes of the implementation of this assessment framework were 'adaptation options' (Nakalevu, 2006) – predominantly material, technical or 'discrete' initiatives, responding to specific, shorter-term climate stresses. In Vanuatu, the Cook Islands and Fiji, communities prioritised and received water supply, capture and storage technology (Barnett and Campbell, 2010). Famously, the Tegua community in Torba Province was assisted with the costs of relocating to higher ground following salt-water inundation (Phillips, no date). In Samoa, a community prioritised and received a sea wall as well as developing management strategies for freshwater springs (Sutherland, et al., 2005).

I am not criticising the CBDAMPIC project or others like it; indeed, these projects should be commended for their early, ground-breaking participatory approach to adaptation, particularly in a region where science and impacts studies had previously prevailed. The project led the way with actual implementation of adaptation at the community scale. Previous efforts in the Pacific (and globally)

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that my capacity to be critical is limited. Furthermore, I recognise that this project occurred mainly before the CBA approach had become widespread or 'theorised'. Indeed, it was among the first specific CBA projects globally. I discuss this particular project because of its application in Vanuatu and the opportunity I had to gain insights from key informants who had been directly involved in the Vanuatu assessments and project implementation. The broad types of outcomes facilitated by the CBDAMPIC projects are not dissimilar in nature to subsequent community-focussed climate change projects implemented in the region.

were focussed on vulnerability analysis and generic national 'capacity building' (mostly to comply with the requirements of the UNFCCC) (Barnett and Campbell, 2010). The methodologies engaged community-members in leading decision-making – something that had previously been rare in adaptation in the Pacific. In Vanuatu, the project was implemented on a 'remote' outer island.

I view the CBDAMPIC project as having generated useful and necessary shorter-term, reactive responses to the immediate and urgent challenges posed by climate, thereby reducing problematic impacts of climate stress in the shorter-term. Additionally, the project recognised the necessity of moving beyond these material or technical solutions to institutionalised responses and accordingly, instigated 'mainstreaming' structures at a government level. The basic overall participatory approach of the CBDAMPIC project provided important lessons for subsequent CBA initiatives in the region, namely, the: 'Climate Change Adaptation project' (University of the South Pacific); 'Climate Witness Programme' (WWF), and; the Red Cross Preparedness for Climate Change Programme (IFRC) (Barnett and Campbell, 2010). I use the example, merely to highlight the ways in which dominant worldviews regarding vulnerability and adaptation translate (through funding, policy and implementing organisations) into 'vulnerability' assessment and 'adaptation' outcomes for communities within CBA.

CBA outcomes of the type produced by the CBDAMPIC project can be viewed as the 'low hanging fruit'. The low hanging fruit in pilot communities involved in the project were directly climate-related problems that were: proximate; 'obvious'; and in some cases urgent to address. Picking the low hanging fruit is good – it makes sense to do this first. 'Technical' or discrete solutions are a necessary component of an effective adaptation response; specific measures geared towards reducing event-centred vulnerability are important, particularly where these minimise current problems faced. Equally as important is 'climate proofing' these where appropriate to minimise maladaptation and increase

sustainability[119] (e.g. if water tanks are required, designing these and associated infrastructure to minimise risks associated with projected changes in rainfall should be undertaken). However, whether this is sustainably reducing community articulated *vulnerability* or building adaptive capacity – as embedded in the 'theory' of CBA – is debatable. As stated by Pelling (1999: 259), too often: "… the structural problems underlying … are overlooked and proximate causes of vulnerability and risk too easily become the core concern of management discourse".

6.3.4 Incorporating local voices and knowledge?

A central principal of CBA is that adaptation activities should engage local knowledge and perspectives and address locally articulated priorities. It is now firmly established in the CBA field that although projects occur in partnership with outside institutions, "communities need to be in the driving seat" (Reid et al., 2009: 23). This requires valuing and working inside local or indigenous worldviews and cultural perceptions of vulnerability to climate stress.

Allen (2003; 2006) and Heijmans (2009), writing from practical experience in the CBDRR field, contend that despite a 'local knowledge' rhetoric, local voices frequently only fit in as far as a project or institutional remit. In the context of CBA, a project remit typically extends as far as event-centred vulnerability reduction. Social factors underlying event-centred vulnerability are addressed within a strictly limited framework. Allen (2003) contends that this contradicts fundamental principles of community-based approaches, often running contrary to adaptive capacity-building project objectives.

This was possibly the case with the CBDAMPIC project. In Vanuatu, assessment comprised a participatory workshop of about a week in each pilot community.

[119] Although where there is a high degree of climate change uncertainty, where climate proofing measures involve high additional cost, and/or where measures involve other risks, climate proofing may not be appropriate and may even risk maladaptation itself.

Assessment engaged various participatory tools from the CV&A toolkit to identify and rank 'prioritised problems', their 'climate-related causes', 'current coping strategies' and 'adaptation recommendations' in each community (Phillips, no date). The problems prioritised and their causes identified by this process were biophysical: flooding/inundation; lack of sufficient drinking water, and; coastal land loss. Causes identified were sea level change and prolonged droughts. Adaptation recommendations were relocation of settlement and providing a water supply system. I do not question that these measures were prioritised by the community itself through the participatory process instead of being imposed from outside (see methodological discussion in Chapter Three). It is likely, however, that the types of problems and solutions that the community *could* prioritise were pre-defined to a degree by the event-centred conceptual framework. Cooke and Kothari (2001) caution against 'forcing' participatory processes. Insights from my research on Mota Lava indicate that the worldview of ni-Vanuatu communities regarding 'vulnerability' is far less event-centred and much more political[120].

In the context of CBDRR, Allen (2003) identifies that in project settings such as this, much effort typically goes into making 'concrete' measures (she cites sea walls) 'participatory', from problem identification to planning to implementation. This appears to mirror the experience of the CBDAMPIC pilot projects – communities themselves led project planning and implementation, but within the pre-defined conceptual framework of the implementation and donor agencies (see Chapter Three). My observations of community-focussed adaptation activities in the Pacific region are that they often operate within a

[120] Since every community lives in different environmental and social contexts I recognise that this view is by no means universal – it may be the case that the vulnerability perception of the participants in the CBDAMPIC project was event-centred, particularly as pilot sites were likely selected because of their immediate environmental problems.

sectoral framework, with 'vulnerable sectors' (e.g. water, coastal) identified prior to participatory processes.

A project developed by an organisation will always have its scope determined by its donor's terms of reference. I am not suggesting that projects like this are not useful – only that a broader view of 'local knowledge' and participation needs to be applied in CBA if initiatives are to be sustainable past project life spans.

6.3.5 Can CBA empower?

CBA strives to empower communities in adapting to climate change. 'Empowerment' has become a 'buzzword' in CBA. In recent CBA discourse, empowerment is generally taken to mean 'helping people to help themselves'. My insights from Mota Lava agree with those of Cuny (1983: 7) who notes: "reducing the vulnerability of the poor is a development question, and such a question must be answered politically"[121] (see also Storey and Hunter, 2010). This poses a particular problem for CBA. CBA is implemented primarily at the local scale and by local actors, yet the factors and processes shaping vulnerability often have wider origins. One of the major impetuses for CBA is the inadequacies of wider development structures in delivering locally appropriate outcomes – yet as the case of Mota Lava illustrates, local empowerment requires *transformation* of these development structures themselves. In the context of CBDRR projects in the Philippines, Allen (2003: 179) contends that:

> Paradoxically, community-based approaches intended to empower participants can also serve to *depoliticize* issues surrounding vulnerability. This is partly due to project discourse which associates vulnerability with hazard events and treats non-event-centred causes and manifestations of vulnerability as outside the scope of the project [emphasis on original].

[121] Although I reinforce the point that Mota Lavans do not view themselves as 'the poor'.

It is important that CBA learns from the experiences of CBDRR (Dodman et al., 2010). The outcomes of the CBDAMPIC project, for example, were limited to reducing climate impacts and were distinctly apolitical. These outcomes were important and useful, but not particularly 'empowering'. Ultimately, CBA is hamstrung by the mainstream discourse of adaptation, which frames the problem as: additional to development; apolitical, and; event-centred.

As has been recognised in the CBDRR field, there may be a certain degree of disconnect between 'espoused' theory and 'theory-in-use' (from Heijmans, 2009: 4). Despite the rise of the starting-point vulnerability perspective which underpins CBA, mainstream international discourse – and therefore funding, assessment, project design and implementation – constructs vulnerability and therefore adaptation as 'hazard-focussed' in a similar way to that described by Allen (2003) above. Constructed thus as a biophysical environmental problem, the responses to vulnerability are apolitical. However, in recent CBA discourse, a 'development' approach for empowerment and transformation is widely espoused. An emancipatory tone is evident, requiring political responses (Ayers and Forsyth, 2009; Dodman et al., 2010). Allen (2003) recognises that CBDRR approaches offer scope for political responses *in theory*, by offering opportunities for local actors to voice their own agendas. However, she contends that this rarely occurs *in practice* because community-based approaches ultimately allocate primary responsibility to community members, local NGO's or local officials who, by themselves, may have little political power to affect wider structures.

Is 'empowerment' asking too much of CBA? Schipper (2009) calls for greater consideration of the wider enabling conditions in the definition of 'community-based', facilitated by external institutions and policies. She recognises that it is difficult to meet adaptation or development needs at the local scale without integration with national-level processes. Schipper (2009) notes that CBA is traditionally defined narrowly as action that takes place in a community,

engaging local adaptive capacity. As has been recognised in the CBDRR field, most of the issues at the root of vulnerability are outside the direct sphere of influence of the community itself, and therefore unable to be addressed by community-scale initiatives (van Aalst et al., 2008).

Smit and Wandel (2006) take the stance that local-scale vulnerability reduction does what is possible *within* wider economic and political structures. Perhaps in practice, this is an appropriate scope for CBA and it should be accepted that CBA is primarily about reducing actual or expected climate impacts through discrete, local-scale actions. As is also identified by Allen (2003), this does not reduce the need to transform the wider structures constraining adaptive capacity by another means. For Mota Lava, vulnerability to climate change is a political ecological problem – effective adaptation (community-based or otherwise) therefore requires political responses as well as discrete local-scale activities.

6.3.6 The 'additionality problem'

CBA is often framed as the 'silver bullet' to integrating development and adaptation at the local scale, but can this occur without affecting change at the scale of wider structures first? On Mota Lava, 'helping people to help themselves' ultimately requires a "new development paradigm" (Schipper, 2007: 8), or at least a substantial improvement to the current development status quo that is threatening traditional knowledge and self-reliance.

Climate proofing development and mainstreaming adaptation into development are approaches commonly advocated to make development 'adaptive' (ADB, 2005; Kabat et al., 2005; Klein et al., 2007). This reflects the 'additionality problem'; that international policy agendas and associated mainstream discourse require adaptation to be distinctly additional to – albeit closely integrated with – development. O'Brien et al. (2008: 194) contend that this is not sufficient for long-term adaptation:

> Linking climate change adaptation to project development through notions of additionality does not carry sufficient leverage to simultaneously address poverty alleviation and climate change.

Mainstreaming and climate proofing approaches generally assume that development 'business as usual' is effective at the local scale thereby requiring additional policy or activities to facilitate adaptation. However, as the case of Mota Lava exemplifies, development 'business as usual' itself is a major contributor to vulnerability. In this context, 'climate proofing' development requires broad changes to development paradigm itself. In many Pacific island – and especially outer island – contexts, national development (and disaster and resource management) policy and planning has little relevance to local communities and as a result, 'mainstreaming' adaptation into it will have little adaptation impact at the local scale (Nunn, 2010). Further, as emphasised by Schipper (2007: 7):

> Mainstreaming will not be effective if existing development trajectories are inconsistent with the objectives of adaptation, i.e. if they explicitly contribute to vulnerability.

It is difficult to prove adaptation 'additionality' in an initiative indirectly related to climate, despite its possible merit in generating adaptive capacity.

6.3.7 Who is the CBA approach for?

CBA is widely proposed as an adaptation approach for the 'most vulnerable'. CBA projects often begin by identifying communities within countries that are most vulnerable to climate change (Reid et al., 2009). In practice, these are generally communities facing existing and significant biophysical environmental problems and associated losses related to climate (e.g. communities in Bagherhat District of Bangladesh). Or, they may be communities already noticing distinct changes in climate (e.g. Inuit communities in the Canadian Arctic (Berkes and Jolly, 2001; Ford et al., 2007). In these communities, climate impacts – or event-centred

vulnerability – are fairly 'obvious' and frequently urgent to address. This appears to have been the case in the CBDAMPIC project; pilot communities selected were those already facing immediate environmental problems[122]. The types of initiatives needed to address these environmental problems, thus minimising further impacts with continued climate change, are fairly straightforward.

Is CBA only for these urgently vulnerable communities? I do not debate that CBA should help the most vulnerable communities, facing extreme environmental problems – tackling these problems is imperative to prevent human suffering. I do, however, argue that CBA has a broader role to play in communities like Mota Lava who may *not* currently be facing significant environmental problems – particularly given its adaptive capacity and resilience-building 'theory'. Many communities such as Mota Lava may not currently be facing extreme and urgent climate-related problems, but are nonetheless facing increasing vulnerability with a combination of social and climate change. Given increasing vulnerability, communities such as Mota Lava may well face extreme and urgent climate-related problems in the future if the causes of vulnerability are not proactively addressed. In these situations, anticipatory and proactive CBA is an imperative. Based on insights from Mota Lava, reducing 'vulnerability' should involve *proactive* initiatives to *minimise the potential for negative climate impacts arising in the first place*. Although climate change is not currently an urgent priority for communities like Mota Lava, it is important not to wait until it becomes one before CBA actions are taken. I argue that CBA needs to involve a more proactive element, enabling preventative activities which may be largely social. I argue that *this* is real vulnerability reduction; the current scope of CBA is largely *reactive* responses to existing and extreme climate impacts.

[122] This is especially the case with the Tegua community in Vanuatu who were facing sea water inundation, making them highly susceptible to sea level change. I recognise the importance of choosing communities where outcomes will be 'high impact' for pilot projects (Weaver et al., 2007).

An event-centred, impacts-reduction approach (as exemplified by the CBDAMPIC project) may make the most sense where communities face immediate and significant environmental problems. For instance, for marginalised communities living in the Bagherhat District of Bangladesh, developing strategies for preventing losses from existing and devastating flooding events is imperative – communities are socially disempowered and have few other options. However, different contexts require different responses. In Vanuatu a great deal of resilience exists at the local level to effectively deal with climate stress, which, in many communities is not significant or currently 'obvious'. I argue that CBA is certainly relevant in these types of situations but that a more proactive approach is required to harness local agency and enhance self-knowledge. To use a hypothetical example, proactive adaptation for the Tegua community in the Torba Province of Vanuatu could have involved building on social resilience so that community decisions to relocate – and *how* to relocate – could have been realistically made either independently, or with outside assistance *at the community's request*. CBA in implementation should be able to meet its theory of reducing vulnerability and building adaptive capacity to prevent communities from becoming 'the most vulnerable' in the first place.

6.4 Climate change, the Pacific and CBA

Climate change in the Pacific has its own prevailing discourse. This discourse is one of 'extra-ordinary' environmental vulnerability and is based on extra-local and extra-regional social constructions of Pacific Islands and climate change challenges. The Pacific climate change discourse is a manifestation of the broader mainstream international construction of climate change and vulnerability as a predominantly biophysical, environmental problem. Concurrently, it is a manifestation of a deeper-rooted, historical, Western 'imagining' of the Pacific as isolated, remote, small, fragmented, fragile, constrained and at risk. Prevailing images shape dominant understandings of places and therefore warrant certain practices (Taylor, 1998). It is therefore "… necessary to ask whose knowledge is being proffered, and what consequences

may follow from it?" (Taylor, 1998: 185) when considering CBA in the Pacific. I argue that dominant, extra-local constructions of climate change and the Pacific downplay the considerable agency, capacity and resilience that exist at the local scale to deal with environmental uncertainty, thereby de-legitimising it and excluding it from adaptation efforts. This is to the detriment of effective CBA in the Pacific region.

6.4.1 Social constructions of Pacific Islands in international and regional discourse

Bankoff (2001; 2004) contends that constructions of vulnerability often reflect cultural values regarding how certain regions of the world are imagined. In the context of disasters, he contends that 'vulnerability' itself is a discourse, related to discourses of 'development' and 'tropicality' that sustain a Western, hegemonic, neo-colonial perception of regions (like the Pacific) as 'more dangerous' than the temperate West.

The Pacific islands, as SIDS, are categorised as being particularly vulnerable to climate change by the UNFCCC (Article 4(8), UN, 1992) and the IPCC (Mimura et al., 2007). Pacific island countries have been cast as inherently vulnerable throughout the development and natural hazards literature though time (e.g. Pelling and Uitto, 2001). This is due to their smallness, isolation, narrow economic bases, and susceptibility to a range of hydro-meteorological and geological hazards. The issue of climate change compounds these notions of extra-ordinary vulnerability. In popular science and the media Pacific islands are frequently referred to as the 'canary in the coal mine' of climate change impacts; bellwether states, presaging the challenges to come for the rest of the world (Nunn, 2009; Kelman and West, 2009). In climate change policy (UNFCCC and its Kyoto Protocol), Pacific islands, as SIDS, are explicitly pinpointed as among the most vulnerable.

These prevailing images of Pacific islands as being extra-ordinarily vulnerable stem from broader economic and geographic imaginings of the region as small,

isolated and generally disadvantaged (Hau'ofa, 1993). Hau'ofa (1993) argues that these images are colonial constructs that legitimised imperial expansion (see also Bankoff, 2001; Taylor, 1998). These constructs are still perpetuated today – smallness and isolation are primary determinants of vulnerability based on Western economic conceptualisations of 'development'. In contrast, Hau'ofa (1993) argues that Pacific Islands are interlinked by their communities and kin across space requiring a different approach to the meaning of development (and therefore adaptive capacity). Islands, when considered from a different viewpoint, are not insular. This particular aspect of adaptive capacity – trans-spatial communities, mobility and remittances – is largely excluded from constructions of adaptive capacity in the Pacific (Barnett, 2001; Barnett and Campbell, 2010). As insights from Mota Lava suggest, this is to the detriment of CBA, as the trans-spatial nature of Pacific Island communities is a potentially valuable intrinsic component of resilience in the context of climate change and environmental uncertainty.

Dominant climate change discourse tends to put all PIC's and their communities into the same category, glossing over the substantial diversity in climate change implications and adaptive capacity (Barnett and Campbell, 2010). Nunn (2010) notes that many donor agencies and advisory bodies at the international and Pacific regional scale make broad assumptions about "both the nature of the climate change challenges faced by Pacific island nations and the pathways by which these challenges should be met" (Nunn, 2010: 238). Citing the issue of sea level change, he contends that a common implicit assumption is that most Pacific Islands are atolls and face similar associated climate challenges. There is an overemphasis on sea level change in Pacific climate change discourse. This risks under-emphasising other challenges relating to variability and extremes that are likely to create more immediate problems for many Pacific Island countries. I have experienced this perception myself at international climate change forums, where the majority of international participants assume Vanuatu is an atoll country. There is a distinct lack of awareness and understanding within the

international community as to the extreme social and geographic diversity in the Pacific region and therefore, as to the diversity of climate-related challenges faced and appropriate solutions to them.

6.4.2 The scientific construction of climate change: implications for the Pacific

Mainstream adaptation discourse, as a result of its discrete policy and funding agenda and disciplinary roots, remains primarily science and impacts focussed. Section 6.3 above outlined the scientific discursive construction of climate change and vulnerability to it. This has particular consequences for vulnerability-reduction in the Pacific region. Bankoff (2001) cautions that "commitment to a particular knowledge system … predetermines the kinds of generalisations made about the subject under investigation … " (Bankoff, 2001: 29). Commitment to the mainstream knowledge system regarding climate change and adaptation generates generalisations about Pacific communities that, to an extent, predetermine the nature of vulnerability assessments and thus determine adaptation trajectories.

A science and impacts focus generates generalisations that environmental factors are the primary contributor to vulnerability in all Pacific islands. From a biophysical science and impacts perspective, it is easy to see why Pacific islands may be perceived as extra-ordinarily vulnerable; they are highly susceptible to climate variability and extremes which are exacerbated with climate change and sea level rise. The majority of their (rapidly increasing) populations live in low-lying coastal areas. Their populations are highly dependent on local ecosystems which are particularly sensitive to changes in climate (Mimura et al., 2007).

The scientific construction of the climate change problem is particularly strong in the Pacific region. This is largely a result of prevailing research and the implementation of adaptation and other projects undergone over the past decade (Barnett and Campbell, 2010). Regionally, the 'meaning' of adaptation – what types of activities adaptation is thought to include – has been strongly influenced by the few major donor-funded regional projects and programmes

that have occurred since the late 1990's, rather than by local conceptualisations of climate problems[123]. These regional projects and programmes have been shaped by what developed-country donors are willing to fund and how they require funding to be implemented, thus reflecting the broader political economy of climate change adaptation (Barnett and Campbell, 2010).

Research to date has been dominated by natural science studies and there is a lack of in-depth social science approaches to generating knowledge about climate change problems and solutions (Barnett and Campbell, 2010). A particularly prominent outcome of this in the Pacific is a perceived need for scientific certainty in order to proceed with adaptation. I do not deny the need for climate science research – this knowledge is always required to better understand the nature of climate change challenges faced into the future. However, lack of scientific knowledge and certainty is not what is hindering effective adaptation for Pacific Island communities. This prevailing perception detracts from the type of research – mainly social science research – that is urgently required if community-focussed adaptation trajectories are to produce effective outcomes for communities themselves. Improved scientific knowledge is not necessarily a priority for adaptation funding in the Pacific; what is already known by 'experts' and local people is largely sufficient to proceed with effective adaptive actions.

I take the standpoint that CBA is largely about increasing capacity to deal effectively with environmental uncertainty through good disaster risk reduction, development and natural resource management. However, uncertainty is not well accommodated in prevailing adaptation approaches in the Pacific. Prevailing research is weighted towards resolving scientific uncertainties and this comes at the expense of developing appropriate adaptation approaches for communities

[123] Although bilaterally funded and NGO implemented projects focussed at the local scale helped to increase and legitimise local voices in regional adaptation efforts.

that build resilience and adaptive capacity. Scientific uncertainty does not need to impede adaptation action (Barnett, 2001), yet it has done to date. Geographic images dominate the Pacific climate change discourse (both 'lay' and 'expert'): islands swallowed by the sea; fragile and narrow ecosystems; high shoreline to land ratio. Barnett and Campbell (2010) argue – and I agree – that although these geographic factors undeniably create stresses for Pacific Island communities, this construction of the problem is overly pessimistic. This partial construction underemphasises consideration of the people living on islands and their resilience, capacity, knowledge and agency. Pacific communities possess considerable capacity to cope with change and uncertainty; capacity that is often not captured by generic mainstream determinants of 'adaptive capacity', based on Western ideals of 'development'.

The tensions between international and local conceptualisations of vulnerability are particularly strong in the Pacific region because of an under-emphasis on socially orientated research. In many Pacific islands, and places within these islands, environmental challenges linked to climate change are indeed highlighting high levels of vulnerability. Climate change does pose particularly large biophysical environmental challenges. However, Pacific communities have been dealing with environmental uncertainty for generations and have a strong cultural tradition of capacity to deal with it. I argue that the dominant scientific discourse of climate change vulnerability in small islands creates an over-emphasis on biophysical stresses at the expense of recognising the importance of the socio-cultural, socio-economic and political factors creating vulnerability. The broad assumptions made about the nature of challenges faced and solutions to them in the Pacific Islands, discourages consideration of socio-cultural capacity, resilience and agency. Again, biophysical causation is not unfounded, but it is partial.

6.4.3 Local human agency, resilience and capacity

Dominant discourses of extra-ordinary vulnerability in the Pacific Islands do not reflect local people's constructions of their own situation. Campbell (2003) cautions that the 'naturalisation' of Pacific island vulnerability results in people's resiliencies becoming invisible: "Because the vulnerable are rarely given voice in such research the trope of their passivity is reinforced" (Campbell, 2003: 100). Although most of this thesis portrays local conceptualisations of the factors threatening ability to deal effectively with climate stress, participants in my research did not view themselves as highly susceptible, fragile or 'at risk' in the context of climate problems. Rather, participants overwhelmingly portrayed climate-related stresses and uncertainty as an inevitable part of existence that they always found a way to deal with and move on (see also Berkes and Jolly, 2001).

I emphasise again that climate-related problems are not high on the list of community priorities. Climate stress-related events were not generally portrayed by local participants as the 'catastrophes' that they may be perceived as through Western/outsider eyes. In this thesis, 'vulnerability' is the main concept underpinning analysis. Barnett and Campbell (2010), however, have been unable to find a Pacific language into which this concept directly translates; 'vulnerability' is not self-identified in the Pacific. Indeed, Heijmans (2004) and Delica-Williston (2004) note that 'vulnerability' does not translate into many indigenous languages, globally. There is no direct *Bislama* translation for 'vulnerability'. There is, however, for 'resilient': it is "*foldaon be i save girrap kwik bakagen*" ("fall over but it can get up fast again") (Crowley, 1995: 427).

Regenvanu (2009) emphasises the traditional economy based in *kastom* as a foundation of resilience in Melanesia – not least due to the food security it provides in the context of climate change. Although participants in my research identified many threats to resilience, they also possess considerable local material and psychological tools that constitute and maintain it (outlined

throughout Chapters Four and Five), not least of which is the trans-spatial nature of community. The major, overarching problem identified by participants was a gradual disuse of many local tools, rather than a complete loss of them. Much potential capacity remains to be self-reliant in dealing with climate events, however, it is perhaps not used to its fullest extent (see also Wisner, 2004). Many tools become 'rusty' as 'shiny' new ones from outside become readily available, however, the community is cognisant that these cannot always be relied upon. Through local eyes, an important part of adaptation therefore, would involve conserving and building upon these existing local tools – building upon existing capacity to deal with environmental uncertainty.

Despite the emphasis on decreasing self-reliance in the substantiative results-based chapters of this thesis, Mota Lava community members are active agents in addressing their own identified climate-related problems. During the time of my fieldwork, I accompanied a small group of men on a data gathering trip to a freshwater spring in the 'middle' section of the island. Mota Lava frequently faces shortages of drinking water (currently provided by roof capture and storage in community tanks) during the dry season. An aid project had previously installed a large groundwater-fed community tank to help address this problem, but the tank had not been installed at a high enough elevation to supply water to taps in the villages. A generator pump had been installed but with limited success because Mota Lava does not have a regular enough supply of diesel fuel for this to be affordable or sustainable. The group – led by a Mota Lavan teacher from Arep High School in Sola – was investigating the feasibility of installing a new tank at a higher elevation, utilizing a traditional water source. The group had sought technical advice from the Vanuatu Department of Geology and Mines and were in the process of measuring water flow, elevation and distance in order to apply to an aid organisation for the required materials. This example demonstrates that motivation and agency is alive and well at the community scale. Counter to the 'naturalised' vulnerability discourse evident in the Pacific region, local people are by no means passive victims of climate.

6.5 Summary

This chapter has synthesised the conceptual and empirical analyses contained in this thesis. According to CBA theory, CBA is primarily about empowerment – helping people to help themselves. Based on insights from Mota Lava, effective CBA for rural communities in Vanuatu requires the inclusion of initiatives that address the social, development-related causes of increasing vulnerability. The types of activities that this would involve are not directly related to climate stress or climate change. Rather than requiring entirely new, discrete, or additional activities for adaptation, climate change increases the imperative for sound, community-led development in order that local people are able to maintain and build upon their own foundation of resilience. In rural Vanuatu, a substantiative part of achieving this is increasing people's ability to live within *kastom* in a contemporary world. Through local eyes, vulnerability is clearly a political ecological process. Effective CBA therefore ultimately requires transformations at national, regional and global as well as local scales.

Effective CBA needs to be proactive and anticipatory. In Mota Lava, and many other rural ni-Vanuatu communities, climate stress and (especially) climate change is not currently an urgent or 'obvious' priority. In many places, environments are not yet marginal. However, vulnerability is increasing because of primarily social factors. This situation is likely to be exacerbated by climate change. Given this, it is important not to wait until climate change *becomes* a priority, before CBA initiatives are undertaken. If CBA is to reduce vulnerability, its role should be to minimise the potential for negative climate impacts to occur, *before* they occur. This is a challenge for CBA because implementation is shaped by the mainstream international adaptation discourse which constructs vulnerability to climate change as a primarily biophysical, environmental problem. The outcome of this – particularly in the Pacific islands, which are constructed as extraordinarily environmentally fragile – is that CBA activities are largely reactive responses to specific climate impacts. If planned CBA is to empower communities in adaptation to climate change rather than merely pick

the low hanging fruit, an expanded mainstream adaptation discourse is required, accommodating activities indirectly related to climate change.

CHAPTER 7

Conclusions

> *There is an inherent risk that in disseminating a dominant climate change narrative, the range of voices and opinion of people most affected is either misrepresented or silenced* (Bravo, 2009: 268)

7.1 Introduction

The previous chapter synthesised the empirical and conceptual analyses contained in this thesis. In this chapter I summarise the findings of my research, directly linking my conclusions back to the aim and objectives set out in Chapter One. I finish by discussing some possible directions for further research.

7.2 Critically evaluating CBA in the Pacific

This thesis has critically examined theoretical and practical aspects of CBA in the Pacific islands region. The thesis set out to answer the question**: to what extent does the mainstream international adaptation discourse enable effective community-based adaptation in Pacific island countries?** The impetus for this research was tensions I observed between local and mainstream constructions of vulnerability to climate stress in the context of rural Vanuatu. Interest in, and funding of, CBA is growing, particularly in the Pacific region. It is therefore important to assess the extent to which CBA is meeting its aims and producing effective and sustainable outcomes for local communities. In particular, I intended my research to redress the distinct lack of Pacific local voices in the climate change vulnerability and adaptation literature, thus contributing to more effective CBA projects and programmes in the Pacific region. Many of the

conclusions drawn in this thesis have relevance to emerging CBA praxis more broadly.

In answering the research question posed above, I fulfilled three objectives. These objectives were: to critically evaluate the mainstream international adaptation discourse, in particular, its conceptual framework of vulnerability; to provide a platform for local voices by investigating local constructions of vulnerability in communities in Vanuatu, and; to evaluate the theory of CBA and critically appraise the extent to which it is applied in CBA implementation.

In order to critically evaluate the mainstream adaptation discourse and its conceptual framework of vulnerability, I reviewed two overlapping bodies of literature: the climate change adaptation literature, particularly that regarding vulnerability-led approaches, and; the wider vulnerability literature, particularly that stemming from disasters research. My review concluded that despite a shift towards the concept of vulnerability in rhetoric, adaptation remains largely impacts focussed. In the mainstream adaptation discourse, vulnerability is constructed as primarily a function of specific climate stimuli, their biophysical impacts and the ability to directly respond to these. This contradicts much of the extensive theorising of the concept in other fields – particularly in disasters research – that drove the shift to vulnerability-led approaches in the first place. I argue that this actively disables adequate inclusion of broader social, political and structural processes in adaptation – factors and processes that may have little to do with climate or climate change, but that are often at the root of people's vulnerability. Adaptation, for the most part, is regarded as additional to development and disaster risk reduction. In particular, I contend that this is to the detriment of effective CBA because it limits the ability to address *vulnerability,* which, as is revealed through objective two, is often caused by development-related failures.

This approach towards vulnerability and adaptation reflects, and is sustained by, the wider mainstream climate change discourse which, I contend, is socially

constructed and therefore partial. For this part of my review I took a critical realist perspective, drawing on moderate social constructivism. I argue that the mainstream adaptation discourse is a product of a wider social construction of the climate change problem as biophysical and environmental. This construction of the climate change problem is based within a Western frame of reference, where nature and culture/society are separate entities and science and politics are disconnected. Climate change could equally be portrayed as a problem of development and inequality. However, in the mainstream literature and policy it is framed as a problem requiring mainly biophysical, environmental, apolitical solutions. From a constructivist perspective, I conclude that what constitutes vulnerability to climate change, and therefore, what actions are needed to adapt to it, are shaped by an inherently Western frame of thought in the mainstream adaptation discourse. This marginalises the voices of 'others' in decision-making for adaptation.

The voices of 'others' were explored by way of my second research objective. To provide a platform for local voices I applied a participatory research methodology based in critical geographical inquiry to investigate local constructions of vulnerability in the community of Mota Lava. I found that the conceptual structure of many established 'participatory' vulnerability assessments for CBA do not sufficiently account for local socio-cultural constructions of climate related problems. I contend that this is a symptom of the mainstream discursive framework of vulnerability and adaptation in the climate change field (outlined above). This conceptual tension hinders the ability of CBA to meet its own aims of empowerment and participation. Including local voices in CBA requires more than communities 'participating' in adaptation activities determined by outside worldviews – rather, it requires vulnerability assessment to be based within local worldviews. If local knowledge and priorities are to be included in CBA in the Pacific region, I conclude that climate change vulnerability assessments – and broader climate change adaptation research – need to be decolonized.

Based on the case study of Mota Lava, I conclude that for many communities in Vanuatu, vulnerability to climate is a primarily social, rather than a biophysical or 'environmental', phenomenon. While the mainstream adaptation discourse perpetuates an event-centred conceptual understanding of vulnerability to climate, ni-Vanuatu communities construct their own vulnerability as arising from a context of everyday lives and livelihoods. Climate stresses are not viewed as ontologically separate to society – they are not abnormal, external, or 'natural', but are a normal part of life and livelihood systems. Through local eyes, event-centred understandings of vulnerability are valid, but superficial. Rather than being the primary driver of vulnerability, climate stresses – like tropical cyclones – merely unveil the social, cultural, economic and political factors that limit the ability to effectively respond to environmental uncertainty.

In rural Vanuatu, vulnerability to climate is inextricable from development-related problems, which, to local communities, are a priority concern. At the core of resilience and adaptive capacity is *kastom*. *Kastom* sustains, and enables the evolution of, local vulnerability reduction tools, allowing communities to adapt to environmental uncertainty. Many of these tools are incidental features of society and livelihoods. However, socio-cultural change is reducing local adaptive capacity, separating vulnerability reduction from everyday life and livelihoods and increasing dependence on undependable external resource flows. Processes of socio-cultural change are, through local eyes, at the core of increasing vulnerability to climate. The root causes of vulnerability therefore are distinctly development-related. Local people view problematic aspects of socio-cultural change to be a product of colonial and post-colonial 'development' processes over time. 'Development' has eroded local self-sufficiency in vulnerability reduction. At the same time, it has not provided higher scale safety nets to compensate. The root causes of vulnerability to climate therefore, are largely outside the direct control of local communities.

I conclude that according to ni-Vanuatu community voices, vulnerability to climate change is a political ecological problem embedded in a wider political economy of development. Contrary to dominant constructions in the mainstream climate change adaptation discourse, ni-Vanuatu constructions of vulnerability resonate with the vulnerability paradigm in disasters research.

In order to evaluate the theory of CBA, I: reviewed the available CBA literature, and; drew upon insights gained at the Third International Conference on Community-Based Adaptation to Climate Change. In order to critically appraise the extent to which it is applied in CBA implementation, I compared the theory to findings from objectives one and two and reached a number of conclusions about the ability of CBA to achieve in practice, what it sets out in rhetoric.

CBA 'theory' consists of both conceptual underpinnings and applied best-practice. Its conceptual basis is the vulnerability-led approach to adaptation. In particular, it is based within a starting-point interpretation of vulnerability, thus emphasising social rather than biophysical causality. CBA is developing its own distinct rhetoric, centring on the notion of empowerment. CBA ostensibly 'helps people to help themselves' by: reducing local vulnerability and building local resilience; meeting community-defined adaptation priorities and needs; building from local values and knowledge; building from community capacities, and; incorporating local voices in decision-making. However, there is a gap between this espoused CBA theory and CBA in practice. The types of initiatives that are funded, designed and implemented in CBA projects and programmes are ultimately determined by the policies of implementing agencies and donors. This, in turn, is shaped by the mainstream adaptation discourse – mainstream understandings of 'what adaptation means' (revealed through objective one). I conclude that the mainstream understanding of 'what adaptation means', hamstrings the ability of CBA to deliver on its rhetoric of vulnerability reduction, empowerment and community-drivenness.

In practice, while CBA is able to effectively reduce the *impacts* of climate stress and climate change by providing discrete responses to climate stimuli-related problems, it is not able to holistically reduce *vulnerability* or empower. Experience from the Pacific region so far shows that CBA produces mainly 'technical' or discrete solutions geared towards reducing event-centred vulnerability. These activities are an important and necessary part of CBA, particularly where they reduce current environmental problems. However, according to CBA theory, they only address half the problem. Based on local voices and priorities in Vanuatu (revealed through objective two), reducing vulnerability requires effective community-led development that legitimizes, sustains and builds upon local resilience and capacity to live with uncertain environments. The types of initiatives that this would entail are distinctly socio-cultural and have little to do directly with climate or climate change. These types of initiatives do not qualify as 'adaptation' within the mainstream adaptation discourse which requires adaptation to be additional to development.

Rather than requiring entirely additional activities for adaptation, climate change increases the urgency of delivering sound community development and disaster risk reduction in Vanuatu in order that communities are able to shape their own futures on their own terms. For local communities in Vanuatu 'development' – or 'underdevelopment' – has been the cause of many aspects of vulnerability. However, the mainstream discourse constructs adaptation as something that is distinctly apolitical. Local voices indicate that if CBA is to be empowering for communities in Vanuatu it needs to broaden its scope beyond projects operating at the local scale.

In theory, CBA offers the opportunity for: local voices to be heard in adaptation decisions; locally defined vulnerability priorities to be addressed; basing adaptation on local knowledge and values; sustaining and improving local capacity and resilience to cope with uncertainty, and; putting communities in the driver's seat of their own adaptation processes. However, the extent to which

these things can be achieved in practice is limited by the mainstream adaptation discourse and its conceptual framework of vulnerability which requires activities to be: event-centred; additional to development, and; apolitical.

Putting CBA 'theory' into 'practice' requires bridging the gap between local and scientific knowledge, and bottom-up and top-down actions. This is no easy task as it requires a political response at a scale higher than the local. A number of effective methodologies exist for integrating indigenous and scientific knowledge in CBA and DRR at a project level (e.g Mercer et al., 2010). Truly bridging the gap, however, will require structural transformations in national and regional development trajectories, in order to redress the power imbalances inherent in current regional development. The following are some practical recommendations for actions that could assist in bridging the power imbalance between indigenous and scientific knowledge in CBA.

At a policy scale, generating an enabling environment for increasing community voice and power in national decision-making about climate change adaptation, DRR and development is required for true participatory CBA. This can be facilitated by building strong local institutions that can forge partnerships with communities and channel community voices upwards. In Vanuatu, provincial governments can play this role. However, they currently largely lack the capacity to do this because of low budgetary allocations to provincial affairs and rural development. This is particularly the case in the Torba Province. Building core institutional capacity within local supporting organisations like provincial governments needs to be a priority of adaptation funding, alongside building technical capacity.

The relationships between communities and external supporting institutions (like provincial governments) need to be sustained past the life of specific projects. To facilitate the process of increasing the audibility of local voices at a policy and planning scale, relationships need to be built on a foundation of trust, knowledge sharing and mutual respect. Supporting institutions involved in CBA – and the

individuals within them – need to be constant over time and not restricted to Meterological Services or National Disaster Management Offices. More cohesive and coordinated partnerships between government entities and NGOs/Civil Society Organisations/Community-Based Organisations would help to facilitate this process by pooling resources and capabilities.

Forging equitable partnerships takes many years and CBA initiatives therefore need long term commitment from both governments and donors. Donor funding horizons need to account for the time required to build sustainable partnerships, engaging coordinated programmatic approaches rather than merely project-based initiatives. At the same time, governments need to demonstrate commitment to integrated rural development, governance, CBA and DRR by increased budgetary allocations at the highest level of government. Donors need to facilitate rather than dictate this process.

At an implementation scale, partnerships need to facilitate better communication of risk information to communities to assist them to use available CBA-related funding in a way that enbles building adaptive capacity in addition to reducing exposure. Often, (and rationally) a sea wall or water tank will be the first choice of communities as these are tangible assets. These choices need to be based on context-specific and locally relevant information. Networks for peer to peer knowledge exchange have great potential to increase understanding of risks and options for addressing them. Establishing networks that enable communities to share their CBA, DRR and development experiences with other communities would increase the power of local voices.

An effective enabling environment is required for effective CBA practices. Based on this study, the following are five criteria of effective CBA in rural Vanuatu and the wider Pacific, by which practice can be evaluated:

1. Ongoing community partnerships are developed with constant external institutions that are not restricted to Meterological Services, Environment Departments or Disaster Management Services

2. CBA initiatives directly align with locally identified development priorities

3. 'Hard' measures are matched with at least equal resource allocations to 'soft' CBA activities, including management, community capacity building and social development

4. The timeframe of engagement is long-term (more than five years), extending beyond project horizons

5. CBA features a holistic 'package' with initiatives targeted to different sectors of the community, including women, youth, different family groupings and different religious groups

7.3 Areas for further research

This thesis identifies the need for a shift in the mainstream international adaptation discourse so that activities defined and funded as 'adaptation' can better meet local needs. Shifting the discourse towards the needs of communities in the Pacific requires a significant increase in the audibility of their voices at the international and regional scale. This is an important area requiring further research. The field of CBA advocates adaptation action rather than 'more vulnerability research'. This is particularly prevalent in the Pacific region where there is some exasperation with projects and programmes involving 'more V&A assessments'. I agree that it is time to move beyond mere vulnerability assessments to implementing adaptation actions. However, it is important that adaptation action is supported by in-depth, critical, applied research – there remains a need for research that challenges and improves the way vulnerability is assessed and the adaptation outcomes of this for local communities.

This thesis provides a platform for local voices regarding vulnerability to climate change in one community in one Pacific island country. There is a distinct need to expand this approach to vulnerability research. There is a need for similar social science research, focussed on local worldviews and knowledge, to be undertaken in more communities in more Pacific island countries, ideally by Pacific islanders

themselves. Publishing this type of research in peer reviewed journals, although of no direct benefit to communities themselves, is a way to feed local voices up into the international discourse, in particular by way of the IPCC process.

CBA practice in the Pacific region would benefit greatly from enhanced knowledge-sharing among projects and programmes. Many lessons have been learned in CBA initiatives that have occurred in the Pacific region over the past five years. However, as of yet there has been little in-depth analysis of these initiatives, other than project-specific evaluation and reporting for donors. An important area for further research is critically evaluating these initiatives so that the successes and limitations among projects and programmes can better inform future CBA.

In particular, there is a need to evaluate the processes and outcomes of past CBA initiatives from a community perspective. A limitation of this thesis is that my evaluation of CBA practice and outcomes to date in the region is not based on substantiative primary research. My analysis in this thesis is based upon project reports and discussions with key informants. The focus has been mainly on one specific project – the CBDAMPIC project. Funds and time permitting, an in-depth, on-the-ground analysis of this, and other projects, would have greatly enhanced the research. Certain aspects of projects may not be reflected in project reports or by the organisations who implemented them. For example, although CBA projects to date emphasise reducing biophysical vulnerability, activities may have provided empowering outcomes in less obvious ways such as by facilitating collective action.

'Impartial' research (i.e. that which is not led by donors or implementing organisations) is needed to document the on-going experiences of communities that have been involved in CBA projects. For example, I would like to apply my *storian* methodology for community-based vulnerability research in the Tegua community in the Torba Province of Vanuatu who were relocated as part of the

CBDAMPIC project. Based on the post-relocation survey report[124] (Nakalevu and Phillips, no date), the urgent biophysical impacts of climate stress were clearly reduced by the relocation. However, what were some of the social implications of the relocation? In what ways did the relocation affect longer-term factors and processes contributing to vulnerability and resilience? For example, were there any negative effects on social cohesion stemming from tensions over land? At the community scale in Vanuatu, such tensions could have extremely significant implications for adaptive capacity, thus heightening other aspects of vulnerability not considered in the project.

This leads into the final suggestion I make for further research in this thesis. An important area that needs research is the role of migration and remittances in adaptation to climate change in the Pacific region[125]. My research on Mota Lava suggests that internal (within-country) mobility is an important factor in the contemporary ability to deal with climate stress and uncertainty. Although not fully substantiated, my research suggests that remittances sent from diaspora in urban centres are an important resource in times of environmental stress. It would seem, therefore, that mobility is an important element of adaptive capacity in Vanuatu. Migration can potentially both alleviate environmental pressure and provide resources for dealing with periods of stress in 'home' communities. This needs substantiating by focussed, empirical research.

In the mainstream discourse, adaptation is largely framed as a static phenomenon – as activities undertaken in particular places. This could be seen as a Eurocentric, partial view. Many Pacific communities operate fluidly over space, both within and between countries. Migration is frequently portrayed as a negative impact of climate change and indeed, in many respects it is – where

[124] Which was undertaken by way of a questionnaire survey methodology.

[125] Migration as adaptation has begun to be addressed by, among others, Barnett and Webber (2010), Barnett and Chamberlain (2010), and Mortreux and Barnett (2009).

environments become uninhabitable and migration is forced. However, consideration of 'forced migration' in response to climate change should not detract from research that examines the ways in which migration can be supported as a positive, adaptive response to environmental stress. Many Pacific communities and cultures have been highly mobile for generations in response to many factors, including environmental (Hau'ofa, 1993). Many Pacific peoples have the socio-cultural resources to negotiate mobility well, in a way that enables them to continue living the lives they want to lead. Supporting migration and remittance flows by building on this capacity therefore, may be an important aspect of adaptation to climate change.

7.4 Concluding statement

I contend that CBA is currently largely reactive, in that it primarily responds to existing environmental impacts rather than proactively building the socio-cultural structures that would minimise the potential for these impacts to arise in the first place. CBA is put forward as an approach for 'the most vulnerable'. However, this should not mean that CBA is restricted to those communities that are already facing distinct and obvious environmental problems. If CBA is to empower – to sustainably reduce vulnerability and increase resilience – it has a broader role to play in preventing communities from getting to the stage where environmental problems are significant. According to a starting-point interpretation, *this* is vulnerability reduction.

This thesis asked the question: **to what extent does the mainstream international adaptation discourse enable effective community-based adaptation in Pacific island countries?** The answer I give to this question is, to some extent. The mainstream discourse enables CBA to 'pick the low hanging fruit' – to reduce aspects of vulnerability directly linked to biophysical climate stressors. However, local voices reveal that vulnerability to climate change at the community scale is a political ecological problem, requiring solutions that are social, cultural, economic and political. *Effective* CBA for Pacific island

communities is likely to require development solutions that have little to do with climate. The mainstream international adaptation discourse in many ways hinders effective CBA in Pacific island countries.

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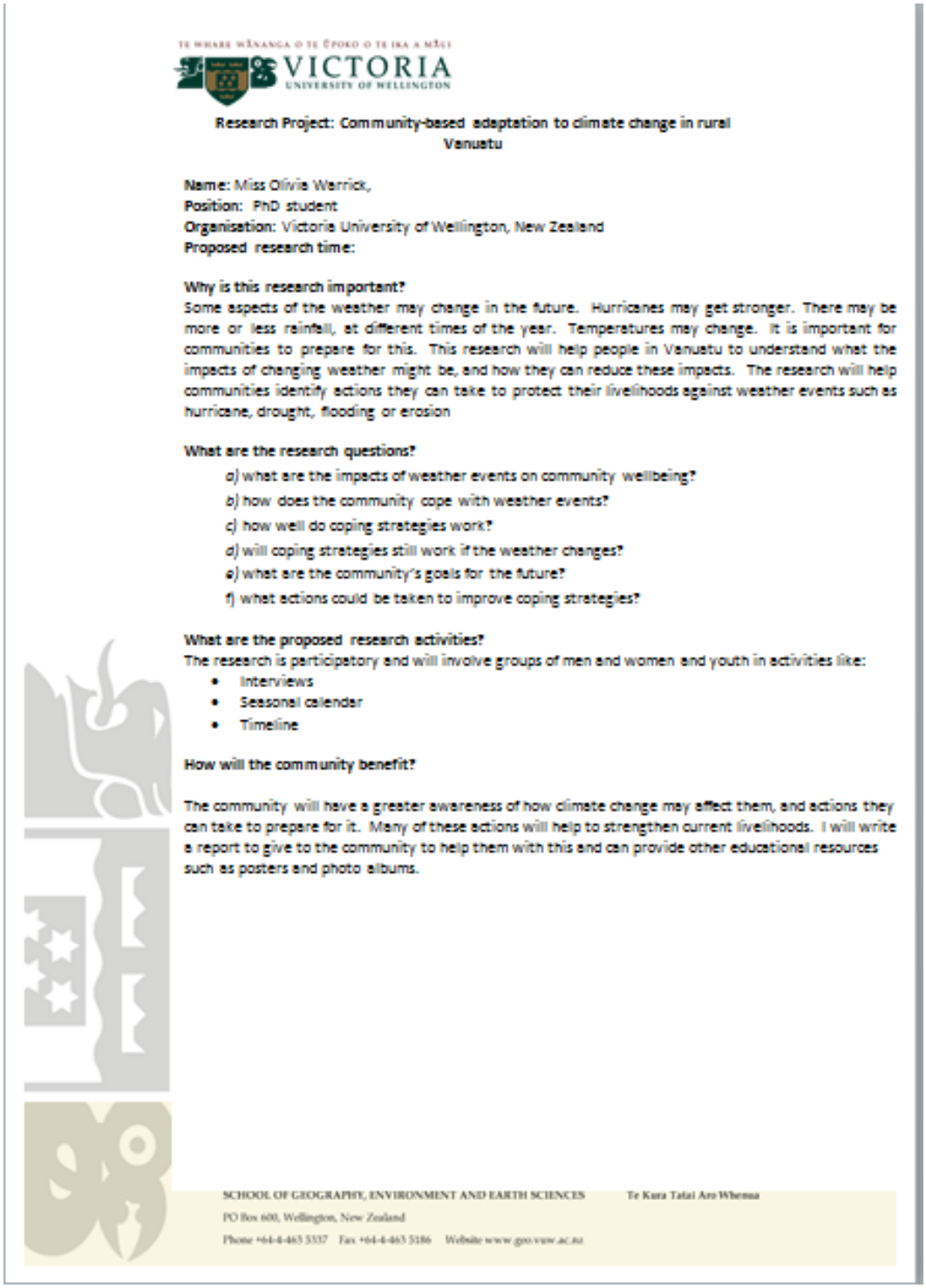
Appendix 1: Information poster for community-based research, English version



TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Research Project: Community-based adaptation to climate change in rural Vanuatu

Name: Miss Olivia Warrick,
Position: PhD student
Organisation: Victoria University of Wellington, New Zealand
Proposed research time:

Why is this research important?
Some aspects of the weather may change in the future. Hurricanes may get stronger. There may be more or less rainfall, at different times of the year. Temperatures may change. It is important for communities to prepare for this. This research will help people in Vanuatu to understand what the impacts of changing weather might be, and how they can reduce these impacts. The research will help communities identify actions they can take to protect their livelihoods against weather events such as hurricane, drought, flooding or erosion

What are the research questions?

a) what are the impacts of weather events on community wellbeing?
b) how does the community cope with weather events?
c) how well do coping strategies work?
d) will coping strategies still work if the weather changes?
e) what are the community's goals for the future?
f) what actions could be taken to improve coping strategies?

What are the proposed research activities?
The research is participatory and will involve groups of men and women and youth in activities like:

- Interviews
- Seasonal calendar
- Timeline

How will the community benefit?

The community will have a greater awareness of how climate change may affect them, and actions they can take to prepare for it. Many of these actions will help to strengthen current livelihoods. I will write a report to give to the community to help them with this and can provide other educational resources such as posters and photo albums.

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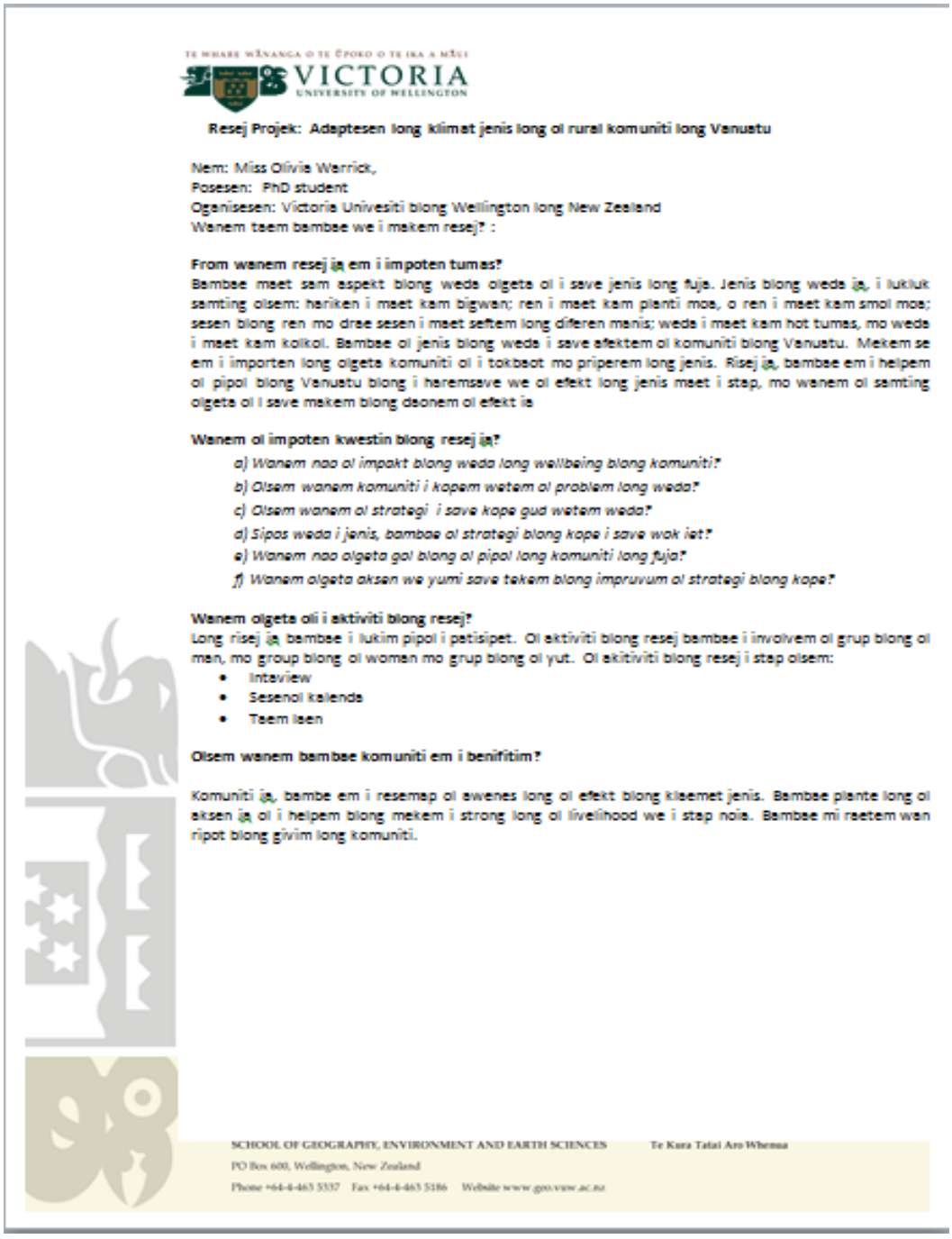
Appendix 2: Information poster for community-based research, Bislama version



TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Resej Projek: Adaptesen long klimat jenis long ol rural komuniti long Vanuatu

Nem: Miss Olivia Warrick,
Posesen: PhD student
Oganisesen: Victoria Univesiti blong Wellington long New Zealand
Wanem taem bambae we i makem resej? :

From wanem resej ia em i impoten tumas?
Bambae maet sam aspekt blong weda olgeta ol i save jenis long fuja. Jenis blong weda ia, i lukluk samting olsem: hariken i maet kam bigwan; ren i maet kam planti moa, o ren i maet kam smol moa; sesen blong ren mo drae sesen i maet seftem long diferen manis; weda i maet kam hot tumas, mo weda i maet kam kolkol. Bambae ol jenis blong weda i save afektem ol komuniti blong Vanuatu. Mekem se em i importen long olgeta komuniti ol i tokbaot mo priperem long jenis. Risej ia, bambae em i helpem ol pipol blong Vanuatu blong i haremsave we ol efekt long jenis maet i stap, mo wanem ol samting olgeta ol i save makem blong daonem ol efekt ia

Wanem ol impoten kwestin blong resej ia?

a) Wanem nao ol impakt blong weda long wellbeing blong komuniti?
b) Olsem wanem komuniti i kapem wetem ol problem long weda?
c) Olsem wanem ol strategi i save kape gud wetem weda?
d) Sipos weda i jenis, bambae ol strategi blong kape i save wok iet?
e) Wanem nao olgeta gol blong ol pipol long komuniti long fuja?
f) Wanem olgeta aksen we yumi save tekem blong impruvum ol strategi blong kape?

Wanem olgeta oli i aktiviti blong resej?
Long risej ia bambae i lukim pipol i patisipet. Ol aktiviti blong resej bambae i involvem ol grup blong ol man, mo group blong ol woman mo grup blong ol yut. Ol akitiviti blong resej i stap olsem:

- Intaview
- Sesenol kalenda
- Taem laen

Olsem wanem bambae komuniti em i benifitim?

Komuniti ia, bambe em i resemap ol awenes long ol efekt blong klaemet jenis. Bambae plante long ol aksen ia ol i helpem blong mekem i strong long ol livelihood we i stap nola. Bambae mi raetem wan ripot blong givim long komuniti.

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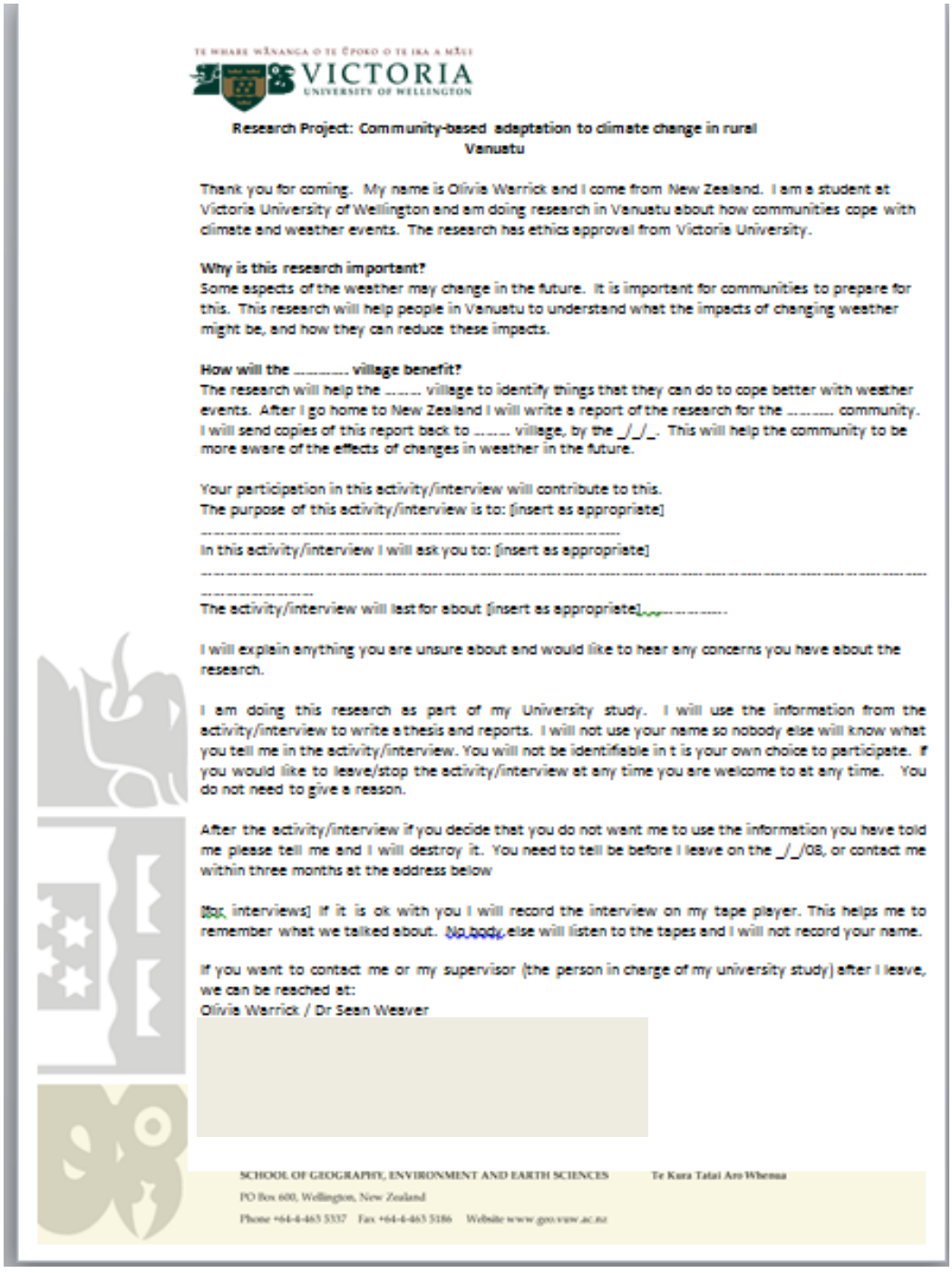
Appendix 3: Information sheet for oral consent for community-based research



TE WHARE WĀNANGA O TE ĀPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Research Project: Community-based adaptation to climate change in rural Vanuatu

Thank you for coming. My name is Olivia Warrick and I come from New Zealand. I am a student at Victoria University of Wellington and am doing research in Vanuatu about how communities cope with climate and weather events. The research has ethics approval from Victoria University.

Why is this research important?
Some aspects of the weather may change in the future. It is important for communities to prepare for this. This research will help people in Vanuatu to understand what the impacts of changing weather might be, and how they can reduce these impacts.

How will the ..... village benefit?
The research will help the ..... village to identify things that they can do to cope better with weather events. After I go home to New Zealand I will write a report of the research for the ..... community. I will send copies of this report back to ..... village, by the _/_/_. This will help the community to be more aware of the effects of changes in weather in the future.

Your participation in this activity/interview will contribute to this.
The purpose of this activity/interview is to: [insert as appropriate]
.....
In this activity/interview I will ask you to: [insert as appropriate]
.....
.....
The activity/interview will last for about [insert as appropriate].....

I will explain anything you are unsure about and would like to hear any concerns you have about the research.

I am doing this research as part of my University study. I will use the information from the activity/interview to write a thesis and reports. I will not use your name so nobody else will know what you tell me in the activity/interview. You will not be identifiable in t is your own choice to participate. If you would like to leave/stop the activity/interview at any time you are welcome to at any time. You do not need to give a reason.

After the activity/interview if you decide that you do not want me to use the information you have told me please tell me and I will destroy it. You need to tell be before I leave on the _/_/08, or contact me within three months at the address below

[for interviews] If it is ok with you I will record the interview on my tape player. This helps me to remember what we talked about. No body else will listen to the tapes and I will not record your name.

If you want to contact me or my supervisor (the person in charge of my university study) after I leave, we can be reached at:
Olivia Warrick / Dr Sean Weaver

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Appendix 4: Participatory activities

Seasonal calendar (approx 2 hours).
This activity will be done twice or more with a group of men a group of women, of 5-15 participants per group, ideally of mixed age. If groups are large, smaller groups can be formed and different parts of the calendar assigned to each.

Participants construct a calendar showing:

- Seasonal differences in weather (i.e dry months, cyclone season) and months
- Corresponding periods of livelihood activity (i.e yam planting and harvesting cycles, garden preperation)
- Activities that remain constant
- Resource prevalence and cycles (i.e mango season, seaworm season)
- Periods of increased expenditure (e.g school fees due)
- Social occurances (e.g malaria prevalent, festivals)

In light of the phenomena identified on the calendar, I facilitate a discussion regarding:

- Attributes of weather extremes and variability that can be problematic (e.g prolonged rainy months, cyclones)
- Implications of this in light of other phenomena identified on the calendar – short and long term
- Ways of coping with impacts
- Effectiveness of these strategies
- Changes over time in the implications of climate and weather
- Changes in the ability to cope and additional needs

Community and resource mapping (approx 2 hours)
This activity will be done twice with a group of women and a group of men, of 5-15 participants per group, ideally of mixed age. If groups are large, smaller groups can be formed and maps of different areas assigned to each.

Participants rapidly draw sketch map/s showing the basic layout of:

- Village area
- Land and marine areas used for livelihoods
- Natural/physical phenomena such as rivers, roads, reefs
- Culturally significant sites

This part of the activity could be done in conjunction with the transect walks or resource area matrix outlined above. Large areas showing spatial layout of different areas and natural phenomena should be indicated instead of specific detail and this could be encouraged by drawing the base map on the sand/dirt using shells etc. and then transferring to paper.

Participants identify and indicate on the map, areas that are particularly affected by different types of climate and weather. If necessary I can facilitate by drawing focus to the three most problematic aspects of climate and weather identified in the physical climate hazard ranking outlined above, and their impacts. I then facilitate discussion regarding:

- How each area/s is impacted
- Implication of impacts
- Reasons for occupation/use of impacted areas (where appropriate)
- Changes over time in areas impacted and degree of impact and why
- Particular years marking particularly problematic occurances
- Existing strategies for mitigating impact
- Potential implications of changes in climate and weather
- How could mitigating strategies be improved/ other strategies that could mitigate impacts and implications

Matrix rating
Participants rate areas of resource use (such as garden, bush, reef, mangrove) from one to five (one being low, five being high) according to importance for different uses (such as income, food, house building materials), by placing markers (i.e stones, shells etc) in a matrix. I identify the initial categories prior to the activity but discuss with participants and adjust accordingly. Participants explain the scores. I then facilitate a discussion using the matrix as a basis, to elicit the following points:

- Most important specific resources in each use category
- Which resource use areas are common property and which are individually owned
- Concerns in relation to the use of resources in these areas (overfishing, soil degradation etc)

Focus group. (approx. 2 hours).
The intention of this activity is to i) allow the community to prioritise their concerns (which are not likely to be climate related) and ii) to focus attention on the 'non-climate' stresses faced in the community (e.g poverty, resource degradation, lack of education, governance), as these are likely to significantly influence adaptive capacity. Secondly, this elicits insights into socio-economic trends and visions for the future in the community that, coupled with changes in climate exposure, are important to the future nature of vulnerability and resilience.

This activity will be done three times - once with a group of women, once with a group of men, and once with a group of mixed gender youth, of 5-20 participants. If groups are large, participants will be broken into smaller groups of 5-6 members each.

Participants discuss together and record (via words and/or pictures) on a large sheet/s of paper:

- Things that they like or that are valuable to daily community life
- The major problems or challenges faced in the community.

I then facilitate discussion about:

- Values that may be under threat
- Why problems and challenges exist

Participants re-group and identify one problem that concerns them most. They identify the root causes contributing to the problem by identifying secondary and tertiary causes in a tree diagram. Participants identify and add the effects of the main problem to the tree diagram in a similar way.

I then facilitate discussion regarding
Changes that could be made by the community to address the problems identified

Transect walks
Participants guide me through the village and significant areas utilized by the community (e.g village, gardens, bush, coastal areas). This may be done in two or more separate transects. I facilitate discussion regarding:

- Social structure of the village (e.g groupings, inequalities etc.)
- Services in the village (e.g telephone, radio, clinic, store)
- Water sources and infrastructure
- Building types, materials and relative proportions of each type
- Waste disposal
- Land tenure
- Soil type
- Vegetation type
- Resource use and important resources for different uses
- Cash crops or sources of income
- Subsistance crops and cropping practices
- Uncultivated resources
- Culturally/socially significant sites
- Issues and concerns

Historical timeline (approx 2 -3 hours)
This activity will be done once with a group containing predominantly older members of the community, of 5-20 participants. Ideally, the group will also contain younger members of the community.

Participants construct a timeline showing significant events, occurances and changes in the communtiy over time (e.g. missionaries arrived, water tank installed, new school built), beginning with the earliest major event recalled.

I then request addition of memorable climate events (e.g big cyclones, long drought), if not already included. I then facilitate a discussion regarding:

- Why these were particularly memorable
- Months of occurrence
- Impacts of each event identified in the short and long term (can use categories identified in initial activities to guide)
- Coping strategies and effectiveness
- Any activities undertaken post-event to reduce impact of future events
- Changes over time in impacts and the ability to cope with events identified and why, with reference to non-climate events identified above (can use trend lines to assist)
- Implications of potential future changes in events
- Steps that could be taken to improve the ability to cope

Appendix 5: Semi-structured interview themes

- Changes in the community over time
- Community problems and concerns
- Major climate events from the past
- Challenges related to Cyclone Funa
- Problems related to climate stress
- Methods of dealing with climate stress
- Changes in ability to adapt to climate stress over time
- Implications of a major climate event occurring in the current situation

Appendix 6: Consent form for key informant interviews

TE WHARE WĀNANGA O TE ĀPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Research Project: Community-based adaptation to climate change in rural Vanuatu

Principal Researcher: Olivia Warrick

School of Geography, Environment and Earth Sciences
Victoria University of Wellington
PO Box 600,
Wellington New Zealand

Research Participant Consent

The researcher is a PhD student at Victoria University of Wellington. The research is being undertaken as part of a PhD thesis. The Victoria University Human Ethics Committee requires that informed consent be obtained for research. Please tick below as appropriate:

- ☐ I have been provided with adequate information about this research project. I understand this information and have been given the opportunity to seek clarification and voice any concerns
- ☐ I understand that I may withdrew from the interview at any time
- ☐ I give permission for the interview to be recorded on a digital recording device
- ☐ I understand that interview transcripts, notes, analysis, and recordings will be accessed only by the researcher, the researcher's supervisor, and a transcriber (who will sign a non-disclosure statement)
- ☐ I understand that I will be provided with a transcript of the interview (or a summary of interview notes if not recorded) to review before use in any analysis or write up, within three months of the interview. I understand that I may withdrew my comments from the research at any time before this.

I understand that if I do not respond to the researcher with any amendments to my transcript within 30 days of receiving it, my comments will be used in the thesis and publications as they stand

- ☐ I wish for a summary report of the research to be sent to me upon completion of the thesis (expected to be January 2010)

TE WHARE WĀNANGA O TE ĪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

Confidentiality

The research will be confidential. Unless a separate 'Waiver of Confidentiality' is signed, no information or opinions given in the interview will be attributable to you personally in the thesis or any other publication resulting from the research. You are welcome to wait until the end of the interview to decide whether or not to sign the Waiver. Please tick ONE of the following:

- ☐ I give permission for my comments to be attributed to me personally in the thesis and any publications. I am happy for my name and the name of my organisation to be used) (sign Waiver)

OR

- ☐ I wish for my identity to remain confidential to the researcher, the supervisor and the transcriber. My name and the name of my organisation cannot be used

Declaration
I consent to participating in this research:

Participant name: .....

Participant signature: .....

Researcher signature: .....

Date: __ / __ / __

Thank you

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PO Box 600, Wellington, New Zealand
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Appendix 7: Ethics approval

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

MEMORANDUM

TO	Olivia Warrick
COPY TO	Dr Sean Weaver, Supervsior
FROM	Dr Allison Kirkman, Convener, Human Ethics Committee
DATE	June 23, 2008
PAGES	1
SUBJECT	**Ethics Approval: No 15694, Community based adaptation to climate change in rural Vanuatu.**

Thank you for your application for ethical approval, which has now been considered by the Standing Committee of the Human Ethics Committee.

Your application has been approved from the above date and this approval continues until 5 January 2010. If your data collection is not completed by this date you should apply to the Human Ethics Committee for an extension to this approval.

Best wishes with the research.

Allison Kirkman
Convener