University of the South Pacific (USP)

Pacific adaptive capacity analysis framework (PACAF)

An assessment of the capacity of 12 rural communities in the Pacific islands to adapt to climate change

12/1/2011

Compiled by the Institute of Applied Science of the University of the Pacific, Suva Fiji in partnership with the Secretariat of the Pacific Community and Australian Red Cross

Australian Government

Department of Climate Change and Energy Efficiency

AusAid

ISBN 978-1-925006-01-8

This report was supported by funding from the Australian Government under the Pacific Australia Climate Change Science and Adaptation Planning (PACCSAP) program.

Copyedited by Econnect Communication

Table of contents

Table of tables

Acronym list

AusAID	Australian Agency for International Development
CCA	climate change adaptation
CCBDAMPIC	Capacity Building for the Development of Adaptation Measures in Pacific Island Countries
EKI	external key informants
GEF	Global Environment Facility
IAS	Institute of Applied Science
IKI	internal key informants
IPCC	Intergovernmental Panel on Climate Change
KCG	Kastom Gaden Association
NCSA	National Capacity Self Assessments
NGO	non-government organisation
PACAF	Pacific community-level adaptive capacity analysis framework
PACC	Pacific Adaptation to Climate Change
PACE-SD	Pacific Centre for Environment and Sustainable Development

PAPGREN	Pacific Plant Genetic Resources Network
PDMO	Provincial Disaster Management Office
PGRFA	Plant Genetic Resources for Food and Agriculture
PLA	Participatory Learning and Action
SIRC	Solomon Islands Red Cross
SOPAC	Pacific Islands Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPC CePaCT	Centre for Pacific Crops and Trees
SPREP	Secretariat of the Regional Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
USP	University of the South Pacific
WRI	World Resources Institute

1. Introduction

This report summarises the outcomes of the adaptive capacity of rural communities assessment studies undertaken by the University of the South Pacific (USP), South Pacific Commission and Australian Red Cross in twelve local communities in eight Pacific island countries—Tuvalu, Vanuatu, Solomon Islands, Samoa, Fiji, Cook Islands, Kiribati and Palau. 'Community' in this context refers to a group of people who reside within a defined geographical space and identify with a common history, local governance system and resource ownership. The study outcomes will contribute to a Pacific regional overview to be published by the Department of Climate Change and Energy Efficiency on climate change aimed to gain a better understanding of climate change vulnerability and adaptation. This report is one component of the regional overview and focuses on understanding the factors that determine the adaptive capacity of Pacific island communities to climate change.

The community assessments will also be put into a context of national and regional adaptive capacity. These have been assessed from existing analyses of capacity such as a recent review of the Secretariat of the Pacific Regional Environment Program (SPREP) and the large Pacific Adaptation to Climate Change (PACC) Project which it is currently managing (Hay, 2009a and 2009b). At the national level, National Capacity Self Assessments (NCSA) were consulted as well as assessments of how well national governments were carrying out functions needed for successful climate change adaptation (CCA). These include assessment, prioritisation, consultation, information management, climate risk reduction and adaptive management. It is considered that the importance of these processes, especially in the Pacific, has been underestimated at the expense of using the asset base as the main measure of adaptive capacity. Assets aggregated at the national level are also not necessarily linked to those at the local level where the adaptive actions are taking place. A function-based approach to assessing and developing adaptive capacity with a focus on multi-level linkages is in line with evolving global thinking such as from the World Resources Institute (WRI) and the World Conservation Union (WRI, 2009; IUCN, 2010).

Increasingly, people are realising that effective actions regarding adaptation and resource management must occur at the local level. To be effective, it is critical that there is strong leadership in the village and an effective governance system. Having awareness, appropriate skills and a strong resource base are also important. At the national level, the key tasks will be to develop a coherent strategy and policies that support this strategy and its enforcement frameworks. Access to funding and awareness are also key areas. Awareness has also been increasingly important to non-government organisations, which are often effective co-managers of local initiatives. At the regional level, countries are supported to advocate informed decisions at international meetings, best-practice materials can be developed and large-scale, multi-country project funding obtained. The integration of all the actors (government, private sector and non-government organisation–NGOs) from the local to regional level and among relevant sectors involved in CCA is a key challenge to the Pacific islands.

The assessments were guided by the Pacific community-level adaptive capacity analysis framework (PACAF) that was developed jointly by the USP, the Secretariat of the Pacific Community (SPC) and the Australian Red Cross at a workshop held in Fiji in February 2011. The seven broad determinants of adaptive capacity in the framework were identified based on institutional experience in the Pacific drawn upon factors outlined in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). These broad factors included the following factors and sub-factors (more details on what each factor/sub-factor means and how they can be managed can be found in Attachment A of this document):

Factor 1 Human capital 1A Traditional and modern skills 1B Health security 1C Change agents
Factor 2 Social capital 2A Community diversity 2B Leadership 2C Strength of collective action 2D Support services and networks 2E Governance
Factor 3 Belief systems, world views, values 3A Traditional values, systems and knowledge (*Mana*)/Modern, Western and church value systems and knowledge 3B Willingness to accept change 3C Self agency vs determinism 3D Here and now vs future thinking 3E Dependence (government, remittance) vs independence
Factor 4 Resources and distribution 4A Land access 4B Fisheries access 4C Income access 4D Water access

Factor 5 Options 5A Adaptation options 5B Monetary livelihood options 5C Food acquisition options
Factor 6 Information and awareness 6A Access to relevant information for adaptation 6B Ability to analyse information 6C Communicated risks and importance
Factor 7 History of dealing with climate events 7A Past experience of dealing with climate events.

In brief, the factors represent:

1. Human capital – attributes of a person that are useful in the relevant context such as education, skills, knowledge and experience
2. Social capital – close bonds within communities, and networks of relations between communities and external organisations, that enable informed, collective, and coordinated responses to manage climate risks
3. Belief systems – the world view of a person, especially where on the fatalism–free will continuum their thinking lies; this can derive from cultural, religious and legal influences
4. Resources and distribution – tangible assets available for productive use and who they are available to, for Pacific islanders this includes land, water, land and marine food and physical assets
5. Options – this refers to the range of opportunities available to cope with the impacts of climate change that cannot be avoided
6. Information and awareness – related to an aspect of human capacity but particularly concerns knowledge about likely climate change scenarios and outcomes of possible adaptation measures and the ability to apply and communicate these
7. History of dealing with climate events – how well people have adapted in the past, what they have learned as to which approaches were or were not beneficial.

The adaptive capacity of rural communities assessments in the eight countries were carried out from March to June 2011 by the same organisations that developed the PACAF and their national partners. The 12 selected study communities had previously carried out CCA projects, or projects that would support CCA in the future, resourced and implemented by various regional and national organisations. Therefore they provide real examples of the ways in which communities implement specific adaptation actions, which helps to advance knowledge of adaptive capacity

(as opposed to developing and assessing communities against checklists of attributes that may not in practice lead to actions). These community adaptation projects addressed issues relating to water management, food security, coastal management, disaster management and relocation. Some key details of the assessments are set out in Table 1.

Table 1 Adaptive capacity of rural communities assessment site information

Country (Assessment dates)	Community (sector)	Adaptation project	Organisations that carried out the PACAF assessment
Tuvalu (27 May–7 June 2011)	Funafuti Community (Water) Lofeagai Community (Water)	AusAID Pacific Vulnerability and Adaptation Project	USP, Funafuti Local Government, Tuvalu Public Works Department (Pacific Adaptation to Climate Change Project), local consultant, and survey assistants
Vanuatu (25 March–11 April 2011)	Tegua Community (Relocation)	Capacity Building for the Development of Adaptation Measures	USP, IUCN, Torba Provincial Council, Vanuatu Farmers Support Association
Solomon Islands (8–22 March 2011)	Pileni Community (Disaster Preparedness)	Red Cross Preparedness for Climate Change Programme	Red Cross Red Crescent Climate Centre, Solomon Islands Red Cross, International Federation of Red Cross & Red Crescent Societies
Solomon Islands (12–23 April 2011)	Takwa Community Plant Genetic Resources for Food and Agriculture (Food security)	Orange fleshed sweet potato, Plant Genetic Resources for Food and Agriculture, SPC	SPC, Kastom Gaden Association (KGA), Baetolau Farmers Association
Fiji (29–31 Mar, 5–7 Apr, 18–20 Apr)	Bavu Community (Water) Druadrua Community (Water) Navukailagi Community (Coastal)	AusAID Fiji Climate Change Adaptation Project	USP
Samoa (12–23 April, 2011)	Upolu (Food security)	Plant Genetic Resources for Food and Agriculture, SPC	AusAID, SPC, International Plant Genetic Resources Institute, National Agriculture Research Institute, USP and Samoa Ministry of Agriculture and Fisheries
Palau (12–23 April, 2011)	Koror (Food security)	Plant Genetic Resources for Food and Agriculture, SPC	SPC, Palau Community College
Kiribati (12–23 April, 2011)	North Tarawa (Food security)	Plant Genetic Resources for Food and Agriculture, SPC	SPC, Ministry of Environment, Lands and Agricultural Development.
Cook Islands (12–23 April, 2011)	Rarotonga (Food security)	Plant Genetic Resources for Food and Agriculture, SPC	SPC, Cook Island Ministry of Agriculture, Research Division

A brief description of the aims and objectives of each project is as follows:

Australian Agency for International Development (AusAID) Pacific Vulnerability and Adaptation Project (Funafuti and Lofeagai,Tuvalu): The AusAID Water Project funded the purchase of water tanks for the government and the private households on Funafuti in mid-2008. The tanks were produced on site at Funafuti utilising a Rotomould 'factory'. A sum of $A585 000 was given to finance this project and 307 water tanks were purchased and distributed to the local communities and to the government departments. On the capital island of Funafuti, water storage has been increased by 10 000 L per household (water storage tanks supplied by AusAid). Despite this measure, communities often experience water shortages during dry periods resulting in problems with health, hygiene and sanitation. In early 2009, AusAID provided funding for a further 300 tanks. Following distribution of all tanks (over 600) the water storage capacity on Funafuti would have increased by more than six million litres. In the interviews, over 90 per cent of the population on Funafuti Island mentioned needing more water tanks for catchment; particularly in dry seasons. Some families claimed that two tanks were insufficient. Despite a better water supply because of the donated water tanks, water shortage is still a problem because many households rely heavily on flush toilets and washing machines which have a heavy demand on water. Results on adaptive capacity from 2010 show that approximately 160 out of 252 households in the Funafuti community and 60 out of the 97 households in the Lofeagai community had water tanks which were supplied by the AusAID project. Other water tanks were privately owned cisterns (16 in total) and water tanks supplied by the European Union (over 300).

The Capacity Building for the Development of Adaptation Measures in Pacific Island Countries (CBDAMPIC) (Tegua, Vanuatu): The CBDAMPIC Project in Tegua, Vanuatu aimed to provide lessons learned for a first step towards building capacity at the institutional and community level to better understand the adverse impacts of climate change and how coping capacity could be improved (Phillips, no date). The impetus for choosing Tegua as a pilot site to take part in the CBDAMPIC project was the obvious and problematic flooding being experienced by the community. After a participatory decision-making process carried out by the multi-sector project team, relocation was identified as the preferred option by the community.

Red Cross Preparedness for Climate Change Programme (Pileni, Solomon Islands): In 2006, the Solomon Islands Red Cross (SIRC) recognised the need to consider the threat of climate change in their programs and during 2007–2009 undertook the Red Cross Preparedness for Climate Change Programme for Pileni, Solomon Islands. The program is a capacity-building one (now implemented in 64 Red Cross/Red Crescent National Societies globally) that links National Societies to climate change- related stakeholders in country, improves understanding of the issue through a national workshop for staff and volunteers, results in a background document on the humanitarian implications of climate change (SIRC, 2008) and an action plan for integration into programs.

Within the action plan, SIRC recognised that it would be necessary to consider climate change within its participatory methodology used with communities. The Vulnerability and Capacity Assessment is used widely in the Red Cross/Red Crescent Movement globally to involve communities in addressing their vulnerability

to natural disasters and other problems. The SIRC has been implementing a pilot project called Community-identified Climate Adaptation in Temotu. As a contributor to the National Adaptation Programme of Action (NAPA) in the Solomon Islands, the SIRC has aimed for the project to contribute to the country's adaptation efforts which are in their infancy as well as result in lessons for the region and further afield in the Red Cross/Red Crescent.

In the site selection for their pilot project on Community-identified Climate Adaptation, SIRC worked closely with the National Disaster Management Office and together they chose the Temotu Province. It receives the least attention of the provinces in the Solomon Islands due to its geographical isolation. The Pileni community was chosen for their particular geographical vulnerability (isolation) as well as disaster response needs in recent years related to storm surges and high-tide events. Their overall vulnerability was the primary reason for their selection with matters relating to climate change evident but used as a secondary reason for selecting Pileni.

Fiji Climate Change Adaptation (CCA) Project (Bavu, Druadrua, Navukailagi, Fiji): The Fiji CCA Project piloted an integrated approach to CCA in six rural community in Fiji from December 2006 to June 2009. The project emphasis was on coastal and water management issues—two of the four most vulnerable sectors identified in Fiji's Climate Change Policy Framework. Funded by AusAID via the Fiji Department of Environment, and implemented by the Pacific Centre for Environment and Sustainable Development (PACE-SD) and the Institute of Applied Science (IAS) of the USP, the project set out to enhance community climate change awareness, incorporate climate change and adaptation in community governance processes, and identify and implement appropriate adaptation measures. The project also involved other stakeholders from various government departments, academics, conservation agencies, NGOs, regional development agencies, other donors, and private water and coastal engineering consultants as project advisory committee members.

Plant Genetic Resources for Food and Agriculture (PGRFA), SPC (Rarotonga, Cook Islands; Tarawa Kiribati; Takwa Solomon Is; Koro Palau; Upolu Samoa): The PGRFA initiative involved the distribution of plant genetic resources for food and agriculture material distributed from the SPC Centre for Pacific Crops and Trees (SPC CePaCT) over the last 10 years. The PGRFA introductions were made in response to requests from the focal points of the Pacific Plant Genetic Resources Network (PAPGREN) and not necessarily in the context of climate change. Therefore, no climate change awareness activities were conducted specifically in relation to these introductions.

2. Literature review

Adaptation

Pacific island communities will have to adapt to what are likely to be substantial changes in climate. Warmer land and sea temperatures, changes in the frequency and intensity of rainfall and tropical cyclones, sea-level rise and damaging flooding and drought events will have a significant impact on people's livelihoods—especially for the majority of the region's population who rely directly on their natural environment for food, water and income. Planning for adaptation is critical for the sustainability of island communities. Such a process must accommodate uncertainties surrounding what the actual localised climate change impacts will be.

The IPCC defines adaptation as the change made or actions taken to enable a system to deal with current or future changes in climate (Adger et al., 2007). There are many uncertainties surrounding what the possible impacts of climate might be, especially at the local level. Additionally, adapting to climate change is confronted by limits and barriers. Limits refer mainly to ecological thresholds while barriers are defined as 'obstacles that can be overcome with concerted effort, creative management, change of thinking, prioritisation, and related shifts in resources, and effort' (Moser and Ekstrom, 2010). As such, the identified barriers to adaptation are essentially those factors that need to be developed in order to enhance adaptive capacity.

Adaptive capacity

The term 'adaptive capacity' in the climate change field is drawn strongly from applications of the concept in the disciplines of natural resources management, and natural hazards and disasters research. Adaptive capacity, as applied in the climate change field, is closely related to the concepts of adaptability (biology, natural resources management), capacity, capability and coping capacity (hazards and disasters), and resilience (ecology, socio-ecological systems research) (Fussell and Klein, 2006; Smit and Wandel, 2006; Tompkins and Adger, 2004; Brooks, 2003; Adger and Kelly, 1999).

In the climate change field, 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). Adaptive capacity is broadly taken to mean the ability of a human system to deal with climate-related exposures and risks (Smit et. al., 2005; Smit and Wandel, 2006). The general consensus in the literature is that enhancing adaptive capacity reduces vulnerability and vice versa.

The oft-cited Adaptation Policy Framework goes into further detail:

> Adaptive capacity is the ability to design and implement effective adaptation strategies, or to react to evolving hazards and stresses so as to reduce the likelihood of the occurrence and/or the magnitude of harmful outcomes resulting from climate-related hazards (Brooks and Adger, 2004: 168)

This construction is shaped by the way in which the IPCC 'places' adaptive capacity in relation to the concept of 'vulnerability'. 'Vulnerability' is the magnitude to which a system is susceptible to disturbance or its potential for loss (Cutter, 1996; Barnett 2001). Vulnerability or potential for loss is determined by exposure and sensitivity to perturbations and capacity to recover, or 'adaptive capacity' (Nelson et al., 2007). Thus, adaptive capacity in the climate change field is generally closely linked to specific climate stimuli and their character, magnitude and rate. 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 (Smit and Wandel, 2003; Smit et al., 2005). This conceptualisation of the relationship between vulnerability, exposure and adaptive capacity is, according to Fussell and Klein (2006), fairly specific to the climate change and global change research communities.

The concept of adaptive capacity as it is now most widely understood in the climate change field became prominent following the shift towards 'vulnerability-led' approaches to adaptation to complement 'impacts-led' approaches over the past decade (Burton et al., 2002). This shift saw greater input from social sciences in vulnerability and adaptation assessment and action and in particular, greater consideration of non-climate stressors that shape ability—or not—to adapt to climate change. A vulnerability-led approach to adaptation puts more emphasis on people's capacity to *respond* to climate stimuli rather than their propensity to be *exposed* and *sensitive* to them. By emphasising adaptive capacity, vulnerability-led approaches frame people as 'active agents' (Hewitt, 1983; Wisner et al., 2004) who are 'adaptive', possessing 'capacity' with which to withstand and respond to climate change. Eriksen and Kelly (2007) note that a common question emerging from vulnerability-led approaches 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?' (Eriksen and Kelly, 2007: 505).

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).

Mainstream determinants of adaptive capacity in the climate change field

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 and skills
- traditional knowledge
- information flows
- 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).

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 that affect vulnerability such as economic wealth, livelihoods, education levels, health, literacy and governance. 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 example, cyclone warning systems and weather-resistant buildings are integral to adaptive capacity in many parts of the world (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). Importantly, adaptive capacity is ‘nested’ (Smit et al., 2005; Smit and Wandel, 2006), meaning local-scale determinants are shaped by higher scale factors and processes at a national, regional and global level (Vincent, 2007).

It is generally accepted in the climate change field that 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.

Applying mainstream construction of adaptive capacity in the Pacific context

Magnan (2010) states that the common climate change conceptual model used to frame the relationship between adaptive capacity and vulnerability is over-simplified and inadvertently encourages a reductionist treatment of the concept. One problem we note with common understandings of climate change adaptive capacity is its explicit links to specific exposures. Adaptive capacity is commonly framed as capacity to directly cope with particular magnitudes of physical climatic events. We feel this common understanding is limited and too 'reductionist' for effective adaptation in Pacific communities. Pacific communities have been dealing with climate variability and other environmental uncertainties for generations and, as such, maintaining and improving (the considerable) existing capacity to cope with uncertainties, whatever the nature of these, is the key to adapting to climate change (Barnett, 2001; Campbell and Barnett, 2010). In critiquing the climate-exposure oriented model, Magnan (2010: 7) points out that:

> '… a territory with a low risk of exposure to natural hazards could potentially struggle to resist a "new" risk, whereas a society accustomed to managing its development according to frequent and diverse natural hazards … could appear more able to integrate the effects of climate change than the former example'

This point is particularly pertinent in a Pacific context. Based on experiences working with Pacific communities in natural resource management, CCA and disaster risk reduction, adaptive capacity has more do to with community's socio-cultural and institutional abilities to help themselves and lead their own adaptation processes than ability to cope with/prepare for specific exposures. Given this, a definition of adaptive capacity that resonates is that given by Gallopin (2006) which encompasses a broader view of adaptive capacity focusing on wellbeing and quality of life:

> 'Adaptability or adaptive capacity of human systems can also be defined as the capacity of any human system, from the individual to humankind, to increase (or at least maintain) the quality of life of its individual members in a given environment or range of environments' (2006: 300)

In Pacific communities, the factors influencing capacity to adapt to climate change are likely to be the same as those influencing capacity to adapt to other types of environmental and social stresses. The ability to effectively deal with specific exposures is of course important, but is fairly superficial in the absence of consideration of deeper social structures. We agree with Barnett and Campbell (2010) and Barnett (2001) that mainstream determinants of adaptive capacity in the climate change field (being based largely on Western ideals of development , e.g. strong economies, gross domestic product and technological capabilities) do not

sufficiently reflect the situation of Pacific island communities. A notion of adaptive capacity that largely focuses on economic and technological development de-emphasises important positive contributors to adaptive capacity in Pacific islands such as resilient subsistence systems and kinship and reciprocity. However, as Magnan (2007:6) points out 'there remain very few studies that … seek to go further in exploring the mechanisms behind socio-cultural or institutional attributes that affect AC [adaptive capacity] in one way or another'. This study will hopefully be seen as such a contribution.

Barnett and Campbell (2010) caution that care must be taken when applying the terminology of 'adaptive capacity' in a project funding and policy context in the Pacific region. Careful consideration should be given to the project or policy scale and to the desired task at hand when interpreting the meaning of adaptive capacity. 'Capacity building' is almost invariably an objective of most donor projects and programs. However, this is commonly taken to mean building 'capacity' at a governmental/institutional scale to comply with the requirements of multilateral and bilateral donors, and in particular, with the complex processes of the United Nations Framework Convention on Climate Change (UNFCCC) and the Global Environment Facility (GEF). Many Pacific island governments have voiced frustration with the multitude of repetitious initiatives to build their capacity in this way—initiatives they often do not require or find useful—leading to country-led calls for less adaptive capacity building and more 'concrete' adaptation. Barnett and Campbell (2010) contend, and we agree, that building generic adaptive capacity at a community scale is an imperative for adaptation funding in the region. The term 'adaptive capacity' should be used with reference to scale and the specific task in order to capture and respond to real adaptive capacity challenges that communities or countries face.

Recognising the limitations of mainstream thinking on adaptive capacity, the approach suggested by the WRI synchronises with Pacific island worldviews. The WRI (2009) suggests that, even though access to wealth and technology is essential for adaptation, adaptive capacity measures needs to be more function-based as opposed to asset-based. The function-based approach recognises institutional relations between actors as an 'adaptation system' just as ecological relationships determine an ecosystem (WRI 2009:1). This approach to adaptive capacity views adaptation 'as an organic process—one which inevitably will grow and evolve in unexpected ways, since every country has a unique set of actors who play different roles in adaptation' (WRI 2009:1). A focus on relationships between stakeholders is a key part of the Fijian *Vanua* concept which implies the interdependence between the natural environment, social and cultural systems 'and the various other institutions established for the sake of achieving harmony, solidarity and prosperity within a particular social context' (Ravuvu 1983:70). This notion is also fundamental to other Pacific island cultures and ways of life, although the actual translations vary according to the local language.

The knowledge, skills and ability to think and act strategically for current and future challenges are human factors that are critical to adapting to climate change. It is therefore critical to strengthen adaptive capacity of rural communities skills alongside the provision of money, technology and technical expertise which are often sourced externally. Strong adaptive capacity of rural communities factors should ensure that the financial and technological resources provided by external agencies are used efficiently and in a way that is empowering for the community themselves. However,

this approach assumes that adaptation project implementers and funders of adaptation projects share this view which, usually, is not the case and out of the control of vulnerable communities of whom the adaptation funds are targeted. Developing community capacity to better influence financial and technological resource flows in a way that is meaningful to their development and way of life should be an essential part of adaptive capacity of rural communities.

3. Methods

The study method was shaped by the PACAF whereby the data were gathered based on the seven main factors and sub-factors determined by the representatives from the partner organisations—USP, SPC and Australian Red Cross—and referred to in Attachment A. From the outset, the framework was intended largely for 'quick and dirty' analysis for application by project implementers rather than in-depth research. The main assessors from USP, SPC and Australian Red Cross worked with local counterparts (as shown in Table 1) to gather data from the communities through the surveys and interviews then compiled results and wrote the reports for each site. The PACAF factors and sub-factors were measured using a combination of household survey, semi-structured interviews with internal and external key informants (IKI and EKI), focus group discussions, personal observation and subjective Likert scale scoring by the USP/SPC/ Australian Red Cross assessors. The household surveys and interview are generally approached through a ‘snowball-sampling’ method whereby respondents were somehow linked to the key community contacts—often the village headman, chief or people directly involved in the community adaptation projects. Focus group sessions were particularly initiated with community women as they were often too involved with domestic activity to attend village gatherings and others were carried out with people who turn out to the community consultations. The communities were assessed via the household questionnaire, although not necessarily all were assessed via interviews and focus group activities for various reasons contained in each community’s detailed report. A brief summary of the methods used to gather data from each study community is as follows.

Household questionnaire

Questionnaires were used for the household surveys. A representative from each household was asked questions relating to general household information, access to resources (food, water, income), dealing with climate-related problems, community cohesiveness, community leadership, individual world views and the CCA project impacts on the community’s access to resources and problem- solving capacity. The questionnaire interviews were conducted in the local language by representatives of the organisations listed in Table 1. In some cases, the questionnaire was modified to suit the local language and context. Responses to the household surveys covered between 60 and 90 per cent of community households as detailed in Table 2 and a copy of the generic questionnaire can be referred to in Attachment B.

Table 2 Percentage of households that responded to the survey per community

USP sites		
Bavu (Fiji)	55	40 households
Druadrua (Fiji)	30	23 households
Navukailagi (Fiji)	35	22 households
Funafuti (Tuvalu)	252	181 households
Lofeagai (Tuvalu)	97	80 households
Tegua (Vanuatu)	10	9 households
Australian Red Cross sites		
Pileni (Solomon Islands)		16 households
SPC sites		
Upolu (Samoa)		9 households
Rarotonga (Cook Islands)		6 households
Koror (Republic of Palau)		11 households
Takwa (Solomon Islands)		9 households
North Tarawa (Republic of Kiribati)		8 households

Interviews

Semi-structured interviews were held with key informants from the community as well as individuals from outside who had close association with the communities referred to in Table 3. IKI included the village headman or Chief, community lay nurses, village pastor, representatives from the committee responsible for the adaptation project and women and youth leaders. EKI included local provincial office representatives, national government staff, local school teachers and external technical persons that worked on the community adaptation project. Most of the interviews were carried out by the assessment team leader for each country. People were interviewed based on their close connection to the project or community and their availability during the time of assessment for each site. The interviews were a means of gaining more in-depth information relating to the PACAF factors, as well as other information that could not be captured through the household surveys and focus group sessions.

Table 3 External and internal key informants interviewed

Community	External key informant/s	Internal key informant/s
USP sites		
Bavu (Fiji)	Project water engineer	Leader of village water committee; village lay nurse
Druadrua (Fiji)	Project water engineer, local school teacher	Village headman; village chief
Navukailagi (Fiji)	2x USP staff of the project	Village head man; village headman's wife; elderly woman
Funafuti (Tuvalu) Lofeagai (Tuvalu)	Foreign development workers, government employees, NGO staff and people from the outer islands who had been involved and were knowledgeable about the situation in Funafuti and Lofeagai	Community leaders, elders and identified change agents
Tegua (Vanuatu)	19 people who were representatives of the local provincial authorities and local civil servants were individually interviewed	20 people on the island including the chiefs and women
Australian Red Cross sites Pileni (Solomon Islands)	Organisations reps from the Provincial Disaster Management Office, SIRC, Solomon Islands Meteorological Office – Temotu Province, Solomon Islands Health Ministry.	Paramount chief – Viakau Ward, Island chief – Pileni

Focus group discussions

Focus group discussions were conducted with several people from the village who belonged to a particular sub-group such as the women's groups, water committee and community elders. The focus group sessions were mainly appropriate for getting information relating to the community's relationship with external organisations, and community history in dealing with climate-related adversity. Participatory learning and action (PLA) tools such as transect maps, Venn diagrams, historical time lines and network diagrams were used to facilitate discussions.

Table 4 Groups consulted from each community

USP sites	
Bavu (Fiji)	Women, village water committee, village elders
Druadrua (Fiji)	Women, youth, village elders
Navukailagi (Fiji)	Women, village elders
Funafuti (Tuvalu)	Women, youth, elders
Lofeagai (Tuvalu)	Women, youth, elders
Australian Red Cross sites	
Pileni (Solomon Islands)	Women, youth, men

Personal observations

Some of the assessors were involved with the communities during the adaptation project implementation process, in particular those for the three communities in Fiji and Pileni Island (Solomon Islands). The USP assessors had previously been involved in implementing Fiji CCA Project —one was a water engineer and the other two carried out climate change awareness and community adaptation planning and implementation. The Pileni community had been identified as a disaster risk management and adaptation project site that was being implemented at the time of the PACAF assessment. Observations made during the project implementation as well as during the adaptive capacity assessment have been included in this report.

Subjective Likert scale scoring

The assessors were also asked to subjectively score the community's adaptive capacity based on the PACAF sub-factors outlined in Attachment A. Using this method, each community's adaptive capacity was subjectively rated by the individuals involved in the adaptive capacity assessment.

The Likert scale values for the different factors thought to be important for adaptive capacity of rural communities are given in Table 5. It is accepted that such an assessment simplifies the high level of detail in the individual site reports. These ratings are arguably quite subjective to the observer. Each assessor had training and independent assessments were made before discussions produced a consensus number. In all cases, the individual assessments were within one unit of each other. Despite the subjectivity of the Likert values for each factor, a semi-quantitative analysis allows for comparison between sites and between countries. The factors have been listed in the introduction and are discussed in detail in the attachments.

The values placed on each adaptive capacity factor per community is based on the average subjective rating of the researchers that conducted the assessment and compiled the reports. The Likert scale score is based on the assessors' subjective rating from personal observation and from the outcomes of household survey, interviews and focus group sessions. Significant discrepancies in scores were rare. Generally, scores in Table 6 are the average of assessors' scores for each factor per community.

Table 5 Likert scale for all the 19 adaptive capacity factors assessed in all 12 communities

1A Skills	Very low traditional and modern relevant skills	Low traditional and modern relevant skills	Some traditional and modern relevant skills	Abundance of traditional and modern relevant skills	High abundance of traditional and modern relevant skills
1B Health	Very low health security	Little health security	Some health security	Good health security	Excellent health security
1C Change agents	None	Some but not listened to	Some and somewhat effective	Good ideas are often implemented	Ideas flow freely at meetings and are analysed and implemented
2B Leadership	No vision, little collective action	Little vision, some collective action	Some vision and implementation	One visionary with good implementation	Several people with vision and implementation skills
2C Collective action	Little group feeling, people seldom work together	Some group feeling, people sometimes work together	Moderate group feeling, people sometimes work together	Good group feeling, people frequently work together	Excellent group feeling, people frequently work together effectively
2D Support services and networks	Few support groups available, ineffective relationship	Some support groups available, ineffective relationships	Fair amount of support groups available, some have effective relationships	Good amount of support groups available, most have effective relationships	Many support groups available, all have effective relationships
2E Governance	Poor decision making processes, limited information sharing	Mostly poor decision making processes, mostly limited info sharing	Some good decision making processes, some information sharing	Good decision making processes, good information sharing	Excellent decision making processes, excellent info sharing
3A Tradition	Very low abundance of traditional values	Low abundance of traditional values	Fair abundance of traditional values	High abundance of traditional values	Very high abundance of traditional values
3B Change acceptance	Strongly disagree	Disagree	Agree in some ways, disagree in others	Agree	Strongly agree
4A Land	Limited land available	Some land made available to some	Adequate land made available to some	Adequate land made available to most	Unlimited land made available to most
4B Fisheries	No fishing grounds available/no catch present	Some fishing grounds available with limited catch available to some	Adequate fishing grounds with catch present available to some	Adequate fishing grounds with catch made available to most	Rich fishing grounds made available to most
4C Income	Disposable income earned is less than $100 a month	Disposable income earned is between $100 and $200 per month	Disposable income earned is between $201 and $300 per month	Disposable income earned is between $301 and $400 per month	Disposable income earned is over $400 per month
Infrastructure and services	Limited infrastructure made available to all	Some infrastructure made available to some	Adequate infrastructure made available to some	Adequate infrastructure made available to most	Unrestricted infrastructure made available to most

4D Water	Limited safe drinking water available	Some safe drinking water available	Adequate safe drinking water available to some	Adequate safe drinking water available to most	Unlimited supply of safe drinking water available to most
5A Adaptation options	No technological adaptation implemented in the last decade/ 5 years	Limited technological adaptation implemented in the last decade/ 5 years	Some technological adaptation in the last decade / 5 years	Successful adoption of 1 or 2 technological options in the last decade / 5 years	Successful adoption of more than 2 technological options in the last decade / 5 years
5B Livelihood options	No income generating options available within the community	One income generating options available within the community	Some income generating options available within the community	Income generating Options available within and outside the community	Readily available income generating options within and outside the community
5C Food options	very limited subsistence and no access to imports	No famine food, limited subsistence, extremely limited access to imports	little famine food, some subsistence, limited access to imports	some famine food, some subsistence, food imports available	famine food, abundant subsistence and abundant food imports available
6A Access to info	No knowledge	Very limited knowledge	Limited knowledge	Good level of knowledge	Very good level of knowledge
7 History of dealing with climate	Very poor ability. Community is heavily reliant on external assistance to recover. Community has few internal preparation, coping and recovery measures in place.	Fairly poor ability Community is reliant on external assistance to recover but has a few preparation, coping and recovery measures	Fair ability. Community has a number of preparation, coping and recovery mechanisms in place. External assistance is usually required for effective recovery.	Good ability. Community has a number of effective preparation, coping and recovery mechanisms in place. External assistance is sometimes required for effective recovery.	Excellently. Community has a number of highly effective preparation, coping and recovery mechanisms in place and is largely self-reliant. External assistance is seldom required for recovery.

National and regional assessments

The five 'function' measures of national adaptive capacity as suggested by WRI (2009) were used for the national assessments. These are

- assessment – vulnerability impacts and existing adaptation efforts regularly assessed and linked to national planning
- prioritisation – have relative importance of adaptation options been assessed and a system in place for periodic review
- coordination – the existence of an authoritative body with a process to coordinate key stakeholders for success adaptation; procedures to evaluate and adapt processes

- information management – systems in place for appropriate data gathering, analysis and dissemination
- climate risk reduction – for priority sectors the risk has been assessed, appropriate adaptation options chosen and being implemented

The kinds of questions used to assess each factor are provided in Attachment C and were obtained from USP/SPC/Red Cross assessors familiar with the particular countries and also analysis of documents that assess these factors. These reports were the national capacity self assessments (climate change component) undertaken by countries under a worldwide GEF initiative (www.sprep.org/ncsa) and the World Bank Stocktake for Disaster Reduction and Climate Change Adaptation (www.oecd.org). To allow for a semi-quantitative comparison, a Likert scale from 1 to 5 was also used in these assessments. For this scale, 5 indicates that the function measure is fully achieved and operating effectively. A score of 3 suggests that some work has been done. A score of 1 indicates almost no effective work has been done. A score of 2 means a start has been made to achieve the function. A score of 4 means that function has almost been achieved. The regional assessment was not the main focus of this work. Conclusions are based on recent regional reviews (Hay, 2009a and 2009b) and the experience of the consultants.

4. Findings and analysis

This section presents the outcomes of the adaptive capacity assessments of the 12 study communities as well as regional and national levels. Table 6 contains the outcomes of the community assessment showing community scores based on each adaptive capacity factor. Rows shaded in blue indicate factors with higher average scores in all sites and those shaded in red represent lower scores.

Table 6 Subjective Likert scores for each community by researchers

Community (country)		Bavu (Fiji)	Druadrua (Fiji)	Funafuti (Tuv)	Lofeagai (Tuv)	Pileni (SI)	Tegua (Van)	Navukailagi (Fiji)	Takwa (Sol)	Upolu (Sam)	Koror (Pal)	Tarawa (Kir)	Rarotonga (Cook)	Av	SD
Adaptation issue		Water security				Disaster Mgmt	Relocation	Coastal erosion	Food security						
1A Skills	1A	4	4	4	3	3	3	4	3	4	4	3	5	3.7	0.7
1B Health	1B	4	3	3	2	2	4	4	3	4	4	2	5	3.3	1.0
1C Change agents	1C	4	3	4	2	3	4	4	4	5	4	3	3	3.6	0.9
2B Leadership	2B	4	3	3	1	3	3	3	4	5	3	2	5	3.2	1.1
2C Collective action	2C	4	2	3	2	3	4	4	4	4	2.5	2.5	3.5	3.2	0.8
2D Support services and networks	2D	3	3	3	3	2	2	3	3	4	2	3	3	2.8	0.6
2E Governance	2E	4	3	4	2	4	3	4	3	4	3	3	unknown	3.2	0.7
3A Tradition	3A	4	4	4	3	4	5	4	4	4	3	4	5	4.0	0.6
3B Change acceptance	3B	3	3	unknown	unknown	4	2	4	unknown	unknown	unknown	unknown	unknown	3.2	0.8
4A Land	4A	5	4	2	1	1	5	5	3	4	4	3	4	3.4	1.4
4B Fisheries	4B	4	5	4	4	4	5	5	4	3	4	4	4	4.2	0.6
4C Income	4C	2	4	3	2	2	2	2	3	5	5	2	5	3.1	1.3
Infra and services	4D	4	2	3	1	1	2	1	1	4	4	2	4	2.4	1.3
4D Water	4E	4	4	3	2	2	3	4	4	4	4	1	4	3.3	1.1
5A Adaptation options	5A	4	4	3	2	2	4	3	3	5	3	2	3	3.2	0.95
5B Livelihood options	5B	4	3	3	2	3	2	4	4	4	4	3	4	3.3	1.0
5C Food options	5C	5	4	4	3	3	5	4	3	5	4	3	5	4.0	0.8
6A Access to info	6A	4	4	4	3	4	3	4	2	5	4	4	4	3.8	0.8
7 History of dealing with climate	7A	4	4	2	2	5	5	4	2	4	3	2	4	3.4	1.4
Average score of each community		4	3.5	3.2	2.2	3.0	3.5	3.7	3.2	4.3	3.6	2.7	4.1		

In analysing the results, the following will be considered:

- the overall average which gives a measure of the Pacific-wide adaptive capacity of rural communities for that factor
- the standard derivative is included as one of the considerations is how much the factor varies among sites.

Factors with high average scores (3.5 or above) include skills, change agents, tradition, fisheries, food options and access to information and these are shaded in blue. Those with the lowest (3.0 and below) are support services and networks and infrastructure and services and are shaded in pink.

A detailed analysis of community assessments based on each adaptive capacity factor is as follows. The meaning for each factor appears in a box and is derived from the developed PACAF contained in Attachment A.

Skills (1A)

An abundance of relevant traditional and modern skills indicates a high level of in-community options to deal with climate problems in a sector that can be complemented by external skills

Given that remote communities are challenged by consistent rural-urban migrations for better education and jobs, it is noteworthy that high averages were attributed to skills, change agents and access to information particularly. Except for Tegua, Pileni, Lofeagai, Takwa and Tarawa which scored 3, the others scored 4 or 5 out of 5. This suggests a competent, well-informed population with people available within the community to harness new ideas. In Bavu most, if not all, of the adult population is literate and has a formal education. About 80 per cent of community members under the age of 40 years had reached secondary school level education. They are therefore able to articulate modern development issues faced by the village and to take advantage of the modern/urban economy by selling natural resource harvests, engaging in casual labour and working in offices in the nearby urban centres of Nadi and Sigatoka. A few community members have also attained tertiary or vocational level qualifications and have some computer knowledge, although none of the households we visited owned a computer. The younger community members are also technology savvy with use of mobile phones and exposure to modern media, although the use of such tools is controlled by access to cash. Most of the houses in the village are built by community members using modern cement, corrugated iron or wood. The community also has a water committee which is largely in charge of the plumbing and maintenance of the communal water system. Most people have attained secondary level with some having tertiary qualifications especially in technical training. Through soldiering and sport many have lived overseas and have a broader view of the world. Many people who have worked in the civil service also retire to their villages. These people are ‘change agents’ who can play key roles in CCA work.

Almost all households have radios and there is reasonable public radio broadcasting including on topical issues such as climate change. Television and mobile phones are becoming more and more common. Working in Pacific villages, it is clear that there are skilled and knowledgeable individuals with great personal potential. These seem key elements to successful CCA. What remains is for this potential to be

harnessed. Initiatives by government and some non-governmental agencies are often assumed to have the answers and they are used to inform communities about what must be done and why. Such approaches have a high failure rate and initiatives that respect and build on the knowledge and experience of community members (and are coherent with their cultural values) are much more likely to succeed.

Health (1B)

Higher health security means higher adaptive capacity (AC) because sick people are less able to implement projects and initiatives and have less time to dedicate to vulnerability-reduction initiatives.

The health of a community is linked to their ability to take action; a healthy individual in the Pacific is one often defined as one who can meet their traditional obligations (irrespective of whether one has a cough or not). Overall, the evaluation of this factor (1B Health security) was a moderate 3.2. Small island sites particularly Pileni, Lofeagai and Tarawa generally scored low as a change to Western diets and crowded living situations and lack of proper sanitation have resulted in a deterioration of the health situation. Lofeagai and Tarawa were heavily dependent on imported food from the shops as a result of limited available land for agriculture. However, another atoll community, Pileni, has access to famine foods (e.g. food preservation), fair access to subsistence foods and poor access to imported food. The foods available to the community from both the sea and from the land crop have remained similar to 30 years ago and imported food is limited by the island's remoteness and low level cash income. The community has traditional methods of preserving food, however changes to the seasons of these foods is undermining this practice. The same can be said about subsistence production of food, where due to the lack of income and remoteness, the community cannot rely on imported products. Concurrent to an increase in population the island is also experiencing a decrease in the fertility of the soil and fish stocks leading many respondents and interviewees to claim that relocation is the only long-term solution.

Even on the larger islands some of these factor come into play; there is the dilemma of high communicable disease existing alongside increasing rates of non-communicable disease. Government health services are also overstretched by these two burdens, particularly when taking into account the high cost of ensuring basic health services on remote islands.

Leadership (2B)

The presence of people who create a positive vision for the community and effectively implement projects reflecting it mean high adaptive capacity

Interestingly, some attributes that might be associated with strong tradition, such as collective action, governance and strong leadership, were not as highly rated as traditional values. Communities that scored poorly on leadership—Lofeagai, Druadrua, Koror and Tarawa—also had poor scores for collective action. In Druadrua, the village mayor had changed three times over the past three years while a newly installed traditional leader was still establishing himself given that he retired to the community after spending his working life on the main island. Most Druadrua community survey respondents felt that leaders were important to solving community

problems. In Lofeagai (Tuvalu), almost one-quarter of survey respondents believed that the leaders were never important to solving community problems, possibly due to the absence of local governing institutions.

Leadership is highly associated with success of an activity as a leader gives the community vision and encouragement to take effective action. Traditional leaders are increasingly expected to make decisions outside of their traditional realm and may not have the skills or information to do so. Root cause analysis (a participatory process of determining the root causes of problems so as to identify changes that need to be made to avoid recurrence (Marguluis and Salafsky, 1998) of a number of resource management projects showed that poor leadership is often seen as a reason for not following rules and for making wrong decisions. In recognition of this, a forum of traditional leaders in Micronesia has been formed to discuss environmental issues and Fiji has embarked on a national project to improve traditional leadership, especially related to natural resource management. Such programs are likely to have lasting impacts in the Pacific, including better community adaptation to climate change.

Collective action (2C)

The ability of the community to regularly work together to achieve community goals. The sense of collective identity that a community feels reflects this. Collective action capacity is also reflected in the number of community groups who have clear roles and responsibilities for key areas and produce effective results.

Collective action has long been seen as a Pacific strength. Traditionally, a day of the week might be set aside to do community work and daily tasks would often be performed within the kinship group. Communities with poor scores (2 or 2.5) in this category were Druadrua, Lofeagai, Koror and Tarawa. Those with high scores (4) were Bavu, Navukailagi, Tegua, Takwa and Upolu. Collective action has eroded as people have become more individualistic and expect to be paid for their time. In addition, newer forces such as Western politics and Western religion have often been decisive forces. In many villages, the original missionary religious denomination brought into an area is being challenged by newer, charismatic/evangelical ones. The differences in practice are stark. As religion is such a core social activity, having different denominations tends to split the village. Additionally, the formation of new religious groups has had a significant impact upon the social structure of the community which will be described in the following sections.

In Navukailagi, collective action is best facilitated through the traditional social structure. For example, the Navukailagi leaders effectively used traditional social structures to encourage collective action in constructing coastal protection. Each clan (*mataqali*) was allocated the responsibility of constructing a groyne (of equal size) to control the increasing coastal erosion that encroaching upon the village boundary. Clans organised themselves socially whereby the male clan members did the physically laborious tasks of carting and piling the groynes, while the women prepared food. However, as playful and positive competition intensified, the women also helped the male clan members with heavy lifting activities with the aim of completing their allocated structure first. The groyne construction was concluded with a communal feast of thanksgiving and in sharing this story. One of the

community members said the he hoped the structure would be a symbol of hard work and community effort to the generations that follow.

Many communities commented that involvement in the CCA Project had been positive in uniting the village to take collective action. Resource issues affect the whole village and thus, if given ownership of the project by using appropriate participatory tools, the implementation can be a collective action of the whole community.

Support services and network (2D)

Community ability to access assistance from a wide range of groups impacts upon ability to adapt

Support services and networks are critical to form partnerships which can provide assistance in CCA. As government services are limited, adaptation support will increasingly need to come from civil society. Most communities felt they had some support but this is an area where improvement can definitely be made. Apart from Samoa which had a score of 4 out of five, the rest of the communities either score 2 or 3 out of 5. For example, the Pileni's Provincial Disaster Management Office (PDMO) undertook disaster awareness in 2010 that explained the organisational structure of disaster response in Temotu including the government to community disaster management structure. This also included awareness around cyclones and tsunamis, planting windbreak trees and work with the community to establish a community disaster plan (still to be produced). The PDMO has a budget to visit Pileni once per year and the health department also visits one to two times per year. Despite the existence of committees and the ability of the Pileni community to come up with ideas, there are still limitations in the access to external services and expertise which hinders implementation. All community respondents mentioned that they have no or very limited access to external organisations to help deal with problems, one stating that their geographical location is a big problem. The community has accessed organisations in the past for composting and water/sanitation projects. Failure of some organisations to follow through on projects has left a feeling of distrust in the community that Red Cross had to overcome.

Many NGOs have been slow to embrace the need for CCA and direct such efforts toward community-based actions. Even with the desire to undertake community based action NGO's face a similar issue to government departments in that the sheer cost of access to communities (or of communities accessing them via trainings, forums etc.) in many parts of the Pacific is prohibitive. Interestingly, some of the smaller countries, where such services may be more visible, tended to rate support services and networks more highly than large, dispersed island archipelago nations such as Vanuatu and Solomon Islands.

Governance (2E)

Community decision-making and implementation processes that are effective within the cultural context. In most cases this will include appropriate input of village people into decision-making and sharing of information needed for this.

Related to leadership is governance. Like leadership, this was generally felt to be about average, with a few sites having better leadership and governance (Upolu, Funafuti, Pileni, Navukailagi and Bavu) and a few less so. The Lofeagai (Tuvalu) community is made up of people from various parts of Tuvalu that do not have a local governing institution, so governance is centralised from the capital. In Navukailagi (Fiji), where the score was high and where a traditional Chief has yet to be installed after almost a century, the community has improvised having the heads of each clan govern collectively. The nearly identical scores for these suggest the close relationship between leadership and governance, the Chief as leader of the community largely determines its governance structure. Traditional governance systems range from more authoritative ones in Polynesia to more egalitarian ones in Micronesia. There is growing pressure for decision-making to be more participatory and transparent both internally and externally. In most places, Chiefs are willing to accept such changes if they are discussed with them and introduced with their approval and 'within the system' rather than being seen as an imposed outside force.

Tradition (3A)

Strong presence of traditional values in day- to-day life indicates higher adaptive capacity because it indicates: a) abundance of relevant traditional skills (1A), b) stronger collective identity, c) more cohesive social groups and d) fewer rifts in the community. A solid presence of traditional values is likely to indicate a better ability to 'indigenise' modern, Western and Church-related values and knowledge, and therefore effectively adapt 'new' ways of doing things to an appropriate cultural context.

These attributes are likely to increase decision-making and implementation capacity. It may also indicate a higher retention of subsistence food production practices. A high level of traditional knowledge will indicate better adaptive capacity.

Pacific islanders are known for the strength and vitality of their culture, which remains the pillar of their existence. Their colonial experience did not in general include loss of their land and language, which are key elements in the maintenance of culture. Apart from Lofeagai and Koror which scored 3 out of 5 in this category, the others scored 4 or 5 out of 5. Overall, most survey respondents in the study sites believed that their communities still placed importance on traditional value systems and practices although they felt that this had declined compared to 20 years ago.

In Tegua (Vanuatu), *Kastom* remains the major framework structuring social capital on Tegua and most islands in the Torres. The IKIs and EKIs indicated that *Kastom* creates the values that shape behaviour, collective identity, and social organisation on Tegua. Life and livelihoods are strongly shaped by accumulated Indigenous cultural knowledge and this is why a multitude of traditional skills remain, that make the community highly resilient to climatic and environmental uncertainty. *Kastom* provides the socio-cultural framework holding these skills in place. For example, a strong subsistence work ethic in the community, including among younger generations, is derived from aspects of *kastom*. This ensures that crop volumes and diversity are high, increasing resilience to periods of inclement weather. The concept of *mana* (personal power and efficacy) is central to the lives and livelihoods of Torres Islanders. *Mana* is tied up in the ability to successfully negotiate the social and environmental situations. The traditional graded society, the *hukwe* (Torres

vernacular), remains an important ritual cycle in the lives of Torres islanders. Achieving status-altering grades in this system depends on personal productivity and success (tied up in *mana*), one aspect of which is in relation to healthy and productive subsistence gardens. This demonstrates capacity to be a 'provider' and 'nurturer'.

The presence of the *hukwe* and the high importance of *mana* may sustain many of the traditional skills outlined in Factor 1(A) above. For example, the production of a significant surplus of crops (particularly yam), the seasonal planting calendar and high labour inputs to gardening, maintain the resilience of food production systems. These are largely incidental skills in that they help people deal with environmental variability, but their primary function (and incentive for continuation) is ritual. In less remote neighbouring islands where a functional graded society no longer exists (there, the graded system is called the *sukwe*), the production of a crop surplus no longer exists and labour time spent in subsistence gardening has greatly reduced—two aspects of food production systems that make communities increasingly vulnerable to weather events. Loss of *kastom* is at the core of both.

For the three sites in Fiji (Bavu, Druadrua and Navukailagi), traditional knowledge and value systems still guides social relations within communities and between communities and outsiders. Similar to most Fijian villages, these communities continue to practice traditional welcome (*i sevusevu*) and farewell (*i tatau*) kava ceremonies with visitors. These formal and respectful ceremonies are meant to assist with the bonding process between the visitor and community. This traditional system is also used for other events within the communities such as births, marriage, circumcision and deaths, although the incorporation of modern goods and materials into this system can be burdensome to community members who have limited cash to access them.

Change acceptance 3B

New ways of dealing with old and new problems could be hindered by a lack of acceptance of new ways of doing things. Conversely, if ways of dealing with problems are retained that are based on traditional practices, they may be successful in dealing with the impacts of climate change.

Change acceptance is an important consideration. A fatalist who believes they cannot change what happens to them is less likely to take action compared to someone who feels they are in control of their fate. This is tied also to religion and a conservative view that it is up to God and He will provide. Religion is important throughout the Pacific and often denominations remain quite conservative in their outlook. People working with communities often report that some people say that there is no need to manage their fisheries or prepare for disasters as 'it is God's will' or 'God will provide'. A fatalist view is tempered by an evolving more activist view and overall most sites had an assessment close to 3 although data on this is incomplete.

Land 4A

The availability of land to use for subsistence needs and the distribution of it. Assume that having sufficient land made available to use for subsistence needs can increase adaptive capacity. Fairly equal distribution of access will indicate higher adaptive capacity.

Along with food and water, availability of land for agriculture, expansion, or retreat from the sea is important. Again there was a sharp division between larger volcanic islands (Bavu, Druadrua, Navukailagi, Tegua, Upolu, Koror, Rarotonga) which ranked their land resources as 4 or 5 out of 5, as compared to the smaller islands, especially atolls such as Pileni, Funafuti, Tarawa and Lofeagai which were rated very low for land availability.

Atolls such as Tarawa already face high migration rates and space is scarce. In Funafuti, domestic disputes relating to land ownership and use have occurred and there is a high dependency on imported food due to limited land available for planting. Increasing populations in Tuvalu's main urban centre in Funafuti have also pushed people to other parts of Tuvalu, such as in Lofeagai, where the number of residents rose from 399 in 2002 to 637 in 2011. Population increases in Lofeagai would require further relocation.

Income (4C) and livelihood options (5B)

Income: The amount of disposable income available to purchase basic needs and the distribution of it within the community. Assume that the amount of disposable income available to purchase basic needs can increase adaptive capacity. A fairly equal distribution will indicate higher adaptive capacity.

Livelihood options: The ability of communities to derive income in the face of climate change. The diversity of means to earn income within a community is an important component of this. Increased available options (diversity) and ability to derive income will increase adaptive capacity

Income is another resource that could allow individuals or communities to better adapt to climate change. Rural incomes are generally low, with few market or job opportunities. Income often comes from excess catch from the sea or extra food grown. Overall, the sites rated this as average; again there was a large difference between the countries of assessed communities from Melanesia (in particular Bavu, Navukailagi, Pileni and Tegua), which had lower scores and countries in Polynesia and Micronesia (Samoa, Cook Islands and Palau) which have strong connections with a developed country and high expatriate numbers and remittances derived from them. Like other Melanesian countries, the healthy subsistence economy is the mainstay of wellbeing on Tegua. However, in the contemporary situation cash is required for some aspects of wellbeing and basic needs.

The main expenses cited by households were:

- clothes
- basic household items such as soap and kerosene
- imported food items such as rice, sugar and tea

- school-related expenses, especially school fees, uniforms, books and transport
- transport, fuel costs and freight.

The household questionnaire asked for an estimate of how much cash was obtained in a year. It was estimated that the average annual income on Tegua is roughly Vatu VT30 000 to VT50 000 ($A310–A$520) although this varied depending on household size, among other factors. This level of income is significantly low compared to the average income of A$1100 per month earned by a Rarotongan farmer.

Individual wealth is seldom accumulated in the Pacific but spent on personal needs or those of friends and relatives; when major projects or individual needs arise, there will be special fundraising efforts to pay for the costs. So more income in and of itself may not be very useful when special circumstances arise. More important could be social capital as one's network is likely to be more useful for obtaining funds than one's income. Another approach is reflected under livelihood options. When funds for a large project are needed, another approach is to have a group undertake joint income-earning for a time. About half of the communities had a score of 4.

Infrastructure and services (4D)

Infrastructure includes accessibility to health services, electricity, transport, telecommunication, main roads linking the village to other areas, shops and schools. Distribution and access to infrastructure. Assume that having fairly equal accessibility to infrastructure can increase adaptive capacity.

Infrastructure and services had by far the lowest score. A few peri-urban sites have scores of 4 (Bavu, Upolu, Koror and Rarotonga) but others were poor or very poor. Navukailagi's access to infrastructure is very poor. Although the community is self-reliant in managing its water supply system and only 20 minutes by a powered boat from the island's main health centre; transportation and energy access is very limited —particularly given that no one in the village owns a boat. The ferry connection to Suva (Fiji's capital) departs once a month and people tend to travel to the main island at risk via open fibre boats. This can take between two and seven hours depending on the weather. The community operates a diesel-fuelled generator for their power supply which can cost up to FJD40 (A$22) per night. Copra seems to be the main commodity as the market is the most accessible. Copra buyers have their own inter-island vessel that visits each island to buy and load copra directly from the producers. Improved transportation to the main urban centres of the mainland could mean better access to markets for non-copra commodities and possibly the tourism industry.

Infrastructure in Pileni is virtually non-existent; the only permanent building is a school classroom. The main reason is the difficulty in bringing equipment and materials to the community because of the distance to the nearest port, which is located at Reef Islands. There are no generators or installed electricity mains on the island. In recent years several households have had small solar panels installed, although these were found to be a gift from a local politician. The island does not have a public telephone, two-way radios, televisions or computers, only a one-way radio which is dependent on batteries and has a limited reception capacity (e.g. if there are strong winds, then the island would get little to no reception).

There is no medical clinic or dispensary on the island which further complicates the community's access to healthcare and adds the additional requirement of seeking medical assistance off the island. Fuel costs are expensive and access is limited due to rough seas. Fuel costs just under 100SBD (US$13) per gallon (3.78L per gallon) which makes transport costs incredibly expensive for remote island communities, particularly given that entire households on Pileni earn between 50 and 200SBD (approximately US$6.50 to US$26.00) per month.

Transport to the main centres requires community members to first get to the Reef Islands. The community purchased its first outboard motorboat in the past five years. Prior to that they were completely dependent on traditional sailing. The Tegua community has very limited access to infrastructure and services, although shipping and communications have improved over the past four years. The island has no electricity mains or generators. There are a few small solar lights but no large, fixed solar panels. There is no waste management system, although little un-biodegradable waste is produced. Houses have no running water and they share pit toilets. There are no shops, although a couple of households have very small-scale stores selling a few specific items. Items are usually bought directly from ships when they visit Tegua.

Tegua has a kindergarten, which was established in one of the 'modern' houses constructed from the rainwater catchment roofs. An IKI interview revealed that the kindergarten is severely under-resourced, as limited communications, underfunding and lack of regular shipping services limits availability of paper, books and pens. Tegua has no school. To access primary education, children must travel to Loh, Hiu or Toga and stay for long periods with extended family. It is common for children to return to the island for school holidays only. More frequent trips home are restricted by transport costs. Obtaining secondary education has been historically virtually impossible in the Torres because of distance, transport cost and school fees. The closest high school is Arep High School in Sola. No household questionnaire respondents had been to high school themselves although some had children who had completed at least one year of secondary school. According to a teacher at Arep High School, increasing numbers of Torres children are attending the school and reaching Class 9 (15/16 years old).

Transport between islands in the Torres is prohibitively expensive. Fuel costs between VT300 and VT350 per litre ($US3.3–US$3.8). Fuel costs have risen over the past few years. The community used to have their own boat that was donated by a local politician. This made transport more affordable because the only cost was fuel. However, the engine broke a couple of years ago and has not been replaced because of cost and the difficulties in obtaining support from external organisations. Now, to travel between islands the community must hire transport from a local boat owner on Hiu, which includes a boat fee.

Shipping services to the Torres have increased to a monthly service since 2010 which has greatly improved access to imported items and export opportunities. However, irregular communications and very high freight charges mean that it is difficult to obtain things such as building materials. For example, through a small grant scheme, the community obtained funding for concrete for the new church floor. However, the concrete was dropped off at the wrong island and was subsequently lost.

Access to government health services is very poor in the Torres. Although major health problems are few in the Torres, lack of access to services is an important factor limiting health security. Each village in the Torres has an aid post or dispensary, run by a trained village health worker. Aid posts provide medication for malaria, common coughs and colds, minor diseases and injuries. More serious conditions are referred to the larger health clinic on nearby Loh or in Sola. There is also a midwife at the clinic on Loh, although many births occur on the islands, assisted by *kastom* midwives. Serious cases of illness or injury are referred to the hospital on Santo. The Torba Department of Health covers the costs of transport and treatment if patients need to go to Sola or Santo, but due to poor communications and other capacity constraints, this can be slow. If treatment is required at the health clinic on Loh, families will often have to cover the costs of boat travel themselves. The Loh health clinic has a consultation fee of VT100 to cover overheads because of a lack of funding from the province. It is therefore common for relatively serious injuries such as broken bones, to be treated locally using *kastom* techniques, instead of on Loh or in Sola. Access to medication for the aid posts and the clinics can be erratic due to difficult communications. It is common for islands to be short of malaria medication, plasters, bandages, topical antibiotic and other frequently required medications for weeks at a time.

There is no telephone landline service or mobile phone coverage in the Torres. The Torres have had intermittent landline services over the years, but these are more often broken than not. Telephone companies do not invest in infrastructure in the north because of remoteness and cost. However, in 2007 the New Zealand High Commission installed a two-way tele-radio on Tegua. This has significantly improved communication ability, making it easier to receive information and contact people from other islands (each island has a tele-radio). EKIs noted that is now far easier for the community to access support from external organisations since they can be in direct contact with the Area Council Secretary based on Loh, without needing to pay transport costs. A shortwave radio tower was recently installed on Vanua Lava, which has improved radio reception to the Torres. Tegua has a few working radios, although the cost of and access to batteries is a problem. Radio and tele-radio is an important source of warning for natural disasters, for example, the community received warning of the recent Japanese tsunami and was therefore able to evacuate to higher ground.

As outlined in the following section, the CBDAMPIC phase improved access to infrastructure by providing water tanks and iron roofing which was subsequently made into semi-permanent buildings. Tegua has very poor access to infrastructure and services, although these are slowly improving with increasing attention by donors.

Although governments commonly express the need for ‘rural development’ and the provision of services, the rhetoric has usually been stronger than the action. Provision of safe water and electricity should be considered basic needs and be a high priority. Such services open up a variety of options in people’s lives. Unless the quality and opportunities for rural living are improved, more and more people will move to urban centres with, in many senses, a deterioration in the quality of life. Surveys have shown that low-income urban dwellers often have poorer diets and health than rural dwellers and crime rates are also higher (Ministry of Health 2004).

Water 4E

Drinking water includes the supply of safe drinking water made available through pipes, wells or tanks. Assume that having accessibility to drinking water can increase adaptive capacity.

Water availability ranked as moderate and there was a clear division between larger volcanic islands and small low-lying atolls. The larger islands such as Bavu, Navukailagi, Druadrua, Takwa, Upolu, Koror and Rarotonga generally all ranked 4 out of 5; water was generally available but not perfect in that water shutdown would occur during heavy rain or during the dry season. In the atolls, water ranked as a major problem for Tarawa, Pileni and Lofeagai which scored 1 or 2 out of 5. Fresh running water is non-existent and the communities depend on wells and rain-water tanks as the main source of drinking water. Groundwater (well), the main source of water for Pileni is becoming increasingly salty. There are about five wells in the community and more than five water tanks which cater for the small number of people in the community. The wells are located on the southern part of the island, that is, they are away from the houses and usual activities of the community. Some are near vegetable gardens and there is sufficient vegetation around the wells to keep them from being exposed to the elements. In the last 30 years, the community has overall been able to increase its access to drinking water with the installation of a handful of community tanks and approximately three household tank. These tanks are either entirely or heavily dependent on rainfall to keep them filled.

Water inside one of the wells on Pileni Island

Most of the wells are quite old and were built more than 30 years ago using traditional materials of rock. The community says that rising seawater and tides are affecting the watertable, as a result water is often salty. Respondents cited references that the community wells are not always safe to drink either. Wells are cleaned once every week by draining the water (the community has a roster) and then cleaning the area surrounding the wells. This in turn has enabled the community to have freshwater on a regular basis. Cooking and washing are the main uses for the wells. One notable observation is that some in the community regularly use the sea for bathing. When asked why they use seawater and not freshwater, the answer is always ‘it’s the island way and has been for many years’. The traditional

method of using coconut as a water supply is something that is still common today as there is no shortage of coconut trees on the island.

On the larger islands, surface water is often the main water source with groundwater and rainwater supplementing this. On the atolls, groundwater and rainwater are used. These sources are under threat from climate change due to more periods of extended drought, evapotranspiration and salt-water intrusion. Provision of safe drinking water is a key millennium development goal and limited progress has been made in improving the situation over the last decade in the Pacific.

Projects such as the AusAID assistance to Tuvalu and the Rotary Water for Life private sector initiative in Fiji are excellent examples of how improved drinking water systems can be provided at reasonable cost. Availability of water will be a key to adaptation and, like the inshore fishery, more resources need to be allocated to this sector to improve adaptability. Droughts and natural disasters usually compromise water supplies; more resilient water systems will make them more capable of adapting.

Food availability (5C)

Means of access to and availability of a variety of safe food options or sources for communities (including subsistence, imported, famine foods etc.). More food options will increase adaptive capacity as some reduction of food options due to natural disaster will not be as serious.

In the rural areas of the Pacific, the subsistence diet is still common where people mainly grow their food and catch their protein from the sea or rivers. Food options and fisheries were the areas rated most highly overall. Except for Upolu which had a score of 3 for fisheries, all the communities had a score of either 4 or 5. For scores on food options, Pileni, Lofeagai, Takwa and Tarawa had a score of 3; the other communities scored above that. Pileni community (Solomon Islands) has access to famine foods (e.g. food preservation), fair access to subsistence foods and poor access to imported food. The foods available to the community from both the sea and from the land crop have remained similar to 30 years ago and imported food acquisition is limited by the islands remoteness and low level of cash income. The community has traditional methods of preserving food, however changes to the seasons of these foods is undermining this practice. Preservation is usually done where there is excess harvest at a certain time of the year. For some crops such as breadfruit, the fruiting season is long. The same can be said about subsistence production of food, where due to the lack of income and remoteness, the community cannot rely on imported products. Concurrent to an increase in population, the island is also experiencing a decrease in the fertility of the soil and fish stocks, leading many respondents and interviewees to claim relocation as being the only long-term solution.

People feel that through subsistence practices or by buying food, they have sufficient options to provide the food needs. This is reflected perhaps in the growing incidence of over-nutrition in the Pacific. According to Fiji's National Nutrition survey, people consume about 30 per cent more calories per day than required for optimal health. The fisheries are also seen to be providing sufficient catch, all site values were at least 3. Although the fisheries in many areas are seen to be declining (smaller fish

sizes, fewer fish per unit effort), a crisis state has not yet been reached. The main reason for these declines is thought to be overfishing (in Fiji 70% of the catch is now sold rather than consumed by the family); pollution and destructive fishing are also threats. In the future, climate change will increasingly be a threat; the Pacific has had incidences of bleaching in the last decade or so but recovery has occurred within three to five years. If bleaching events become more common and acidification of reefs accelerates, the habitats that provide many of these fish will be degraded, which would eventually lead to a reduction in fish numbers. Climate change adaptation in relation to the inshore fishery has not received the attention it deserves, perhaps due to a perception that the fishery is not under threat or that little can be done about it. These both seem to be false assumptions and, given the importance of the resource, more work in this area is needed. This is especially true as during the past decade or so, a participatory tool called community-based adaptive management (learning through practice) has been promoted by the Locally-Managed Marine Area Network which has, in hundreds of sites in the Pacific, started to reverse the trends in the decline of fish numbers, biomass and the health of the habitat.

Access to information (6A)

Theoretically, a higher level of awareness about the scientific causes of climate change, its potential impacts and adaptation measures is reflective of the community's ability to make informed decisions on solutions to reduce their vulnerability to climate change. However, it appears that too much emphasis is placed on the role of climate information in local adaptive capacity and that access to scientific climate information and predictions do not have as much impact on adaptive decision-making at the local scale as commonly thought.

The assessment outcomes related to community awareness of climate change suggests that past efforts in awareness raising and capacity building have had some success. But even though this is important, perhaps in the future emphasis should be more focused on particular needs. Tegua, Lofeagai and Takwa scored 2 or 3 out of 5 in this category; the others scored 4 or 5 out of 5.

The Tegua community has a high level of climate change awareness because of the CBDAMPIC Project. An IKI explained that although the community had noticed erosion since the 1990s, they did not know the cause until the CBDAMPIC team told them about climate change. Prior to this they thought that erosion was due to increasing winds and swells from the south-east. Similarly, the community did not know about the scientific causes of earthquakes and tsunamis prior to an earthquake in 1997 when a scientist from OSTROM visited to make measurements. Despite some impediments to the uptake of new knowledge, local informants in the assessment appeared fairly accepting of these scientific explanations for the environmental stressors they were experiencing.

The community is aware that outsiders have identified climate change as a specific problem for them. Many visitors including 'climate change tourists', documentary makers and reporters have arrived in Tegua since the CBDAMPIC project to view 'one of the first communities forced to relocate because of climate change'.

Chief Richmond with a copy of a magazine article written by a Swiss reporter about Tegua and climate change

As one EKI observed, climate change has certainly become a common language on Tegua. Less clear is whether or not people possess a thorough understanding of climate change impacts that will assist in local adaptive decision-making. Local informants recognised that the increase in flooding in Lateau (an area from which the Tegua community was relocated) was directly linked to the 1997 earthquake. They had observed the higher watertable following the earthquake and the accelerated coastal erosion after this time. However, the 'climate change language' was often mixed up in people's explanations of this event, that is, 'climate change' started to happen after 1997. In the focus group for example, when asked about observed climate and weather conditions, some participants noted the earthquake event as 'climate change'. There may be also be a risk that climate change gets blamed for problems for which social change is the main contributor. For example, local informants attributed less productive yam crops to increases in rainfall during December to March as a result of 'climate change'. However, many had noted in other contexts that labour inputs were reducing in gardens—yam requires very high labour inputs to grow well. It is likely that yam is becoming less productive for a range of social and environmental reasons.

Personal observation by the USP assessor in Tegua indicates that climate change is often used to explain environmental stress but that past the rhetoric, it is probably not a major factor affecting local decisions in the community. The most useful climate information awareness for communities such as Tegua is likely to be an appreciation that climate change will exacerbate environmental variability, extremes and general uncertainty. The community has a good grasp on the uncertain nature of their environment and the need to reduce risk to it. For example, no local informants would consider moving back to Lateu, even though the earthquake in 2010 solved much of the flooding problem at the site. This is because they recognise the unpredictable nature of their environment—the site could easily 'sink' again and they would not want to take the risk.

In the three Fijian communities assessed (Bavu, Druadrua and Navukailagi), scientific interpretations of climate change were disseminated by the project

implementers to complement existing local knowledge on environmental and climatic change in the local environment. After taking part in the awareness workshop, community leaders and decision-makers encouraged community members to engage in the project activities. For Druadrua village, a new village water committee was formed and became a visible part of the community social structure. In Bavu and Navukailagi, most survey respondents indicated that the project had enhanced community cooperation and leadership.

However, as the above examples demonstrate, the behavioural change that occurred during the project may not have been solely due to increased awareness of climate change science. But also due to the fact that adaptation projects have the resources and the technical expertise to enable the community deal with more immediate problems related to water and coastal erosion. This was also largely due to the project responding to immediate community needs relating to water and coastal erosion—also the most immediate climate risks.

History of dealing with climate stress (7A)

A history of dealing with climate events may equip communities with skills, knowledge, institutional arrangements and mechanisms for dealing with future climate stresses. A history of effectively dealing with climate stresses may therefore indicate high adaptive capacity. A history of effectively dealing with changes and disruptions in general may also indicate high adaptive capacity. On the other hand, a history of not effectively dealing with climate stresses may reduce adaptive capacity by generating despondency and 'psychological dependency'. Lower scores mean a high dependency on external assistance to recover.

Another important aspect of community adaptability has to do with past history of dealing with (climate) change, attitudes towards change, adaptation options and the support services and networks that can assist in adaptation. For these factors, there was a moderate overall assessment. History of dealing with climate change will in some ways reflect the experience in implementing the case studies that are being written up. In the Melanesian countries these were generally quite positive as in Samoa and the Cook Islands. Except for the Solomon Islands, food security site (Takwa), low scores were generally associated with atoll countries where the burden of dealing with climate change may have become overwhelming. This dichotomy also existed with adaptation options but somewhat less markedly with communities on larger volcanic islands assessed as 3 to 4 and others as 2 to 3.

The community of Tegua Island is certainly 'accustomed to managing its development according to frequent and diverse natural hazards'. Because of the robust traditional skills, food production systems, social networks and strong psychological self-agency, Tegua has dealt well with major climate events and periods of climate-related stress in the past. Local strategies, mechanisms and systems for minimising vulnerability are woven into the fabric of everyday lives and livelihoods and this equips the community well for dealing with future climate variability and extremes.

Focus groups in Tegua identified cyclones in 1972, 1979 and 1988 to have been the most problematic climate events. These cyclones were of high magnitude and caused widespread destruction in most sectors. However, these were not perceived

as particularly concerning, as observed throughout Vanuatu where participants stressed that they would always find a way to deal with cyclones and move on. The other major 'hard time' identified was the 1997 earthquake and exacerbated flooding that followed. Participants viewed this as somewhat more concerning as lack of access to water hindered autonomous relocation. Nonetheless, participants stressed that they were addressing the problem in their own time and in their own way—a process that was assisted by the CBDAMPIC Project. Droughts were not considered to be a problem by participants. EKIs observed that the Torres islands receive higher rainfall than much of Vanuatu although El Niño periods (1998, 2003) have caused water shortages in the past. Time-line participants did not identify cyclone events as a 'hard time' however.

When asked their opinion on ability to effectively deal today with a high magnitude cyclone such as in 1972, most Tegua participants agreed that it would be easier because of greater availability of rice and other imported food. On the whole, they perceived traditional skills to be robust enough to see them through (although note changes in 'mentality' outlined in Factor 3C). Many pointed to the example of Cyclone Vania, a relatively low magnitude cyclone that had occurred earlier in 2011. Cyclone Vania caused moderate damage to food crops. Following Vania, formal government food relief did not arrive. According to local participants, government food relief has not been received since 1988. Small amounts were received from the Anglican Church and from Torba diaspora living in towns. Because of an abundance of local coping strategies however, problematic food shortages were not experienced.

Project implications on adaptive capacity of rural communities

An overall assessment of the success of the project in meeting its objectives as well as in relation to its impact on adaptive capacity is as follows:

Table 7 Plant genetic resources for food and agriculture (PGRFA) assessment

Was the project successful in achieving its objectives? In what way?	Very minimal adoption	Minimal adoption	Medium adoption	Successful adoption	Medium adoption
What were the drivers to success?		Perseverance of farmer Good taste Limited income generating opportunities (e.g. banana farmer)	Availability Researcher's enthusiasm and commitment Interested farmers	Value/importance of taro in the Samoan culture Response to a real disaster Researcher's enthusiasm and commitment Ease of access of PGRFA germplasm	Good taste High carotene content Persevering lead farmer Need to produce their own food
What were the barriers to success?	Market preference Limited exposure to	Environmental constraints Availability of and attitude to	Market preference Availability of and attitude to	Superior varieties supersede previous ones	Proximity to access point and therefore cost to access

Was the project successful in achieving its objectives? In what way?	Very minimal adoption	Minimal adoption	Medium adoption	Successful adoption	Medium adoption
	disasters Limited awareness as to future impacts of climate change	imported food Isolation	imported food Isolation (in the case of Kayangel)		PGRFA and information Remoteness
Did the project enhance adaptive capacity of rural communities? In what way?		Enhanced income and livelihood options Enhanced food options	Enhanced food options	Enhanced food and livelihood options	Enhanced food and livelihood options

Table 8 Fiji CCA Project assessment

Was the project successful in achieving its objectives? In what way?	Very successful. • Significantly improved community water supply • Community water committee very involved during project planning and implementation • Water committee still active two years after the project	Successful • Significantly improved community water supply • Community was actively involved in the project planning and implementation process	Very successful • Able to control coastal erosion • Community was actively involved in project planning and implementation
What were the drivers to success?	• Urgent need for water by the community • Community cooperation within and with project implementers • Good supportive relations between traditional leaders/elders and community youth • Accessibility by project personnel • Proactive change agents (water committee reps) • Communication skills of change agents	• Urgent need for water by the community • Authority of traditional leaders	• Urgent need to address coastal erosion problem faced by the community • Community enthusiasm to contribute to the construction of groynes and coastal revegetation • Effective collective leadership between clan or *mataqali* heads • Community open to new ways of doing things

What were the barriers to success?	• Poor project history requiring time to build community trust with project implementers • Relatively large population for limited water source	• Limited community cooperation • Youth population and water committee not very communicative • Island not easily accessed so activities required more time and money to complete	• Difficulties in accessing the community – needs relatively more time and money
Did the project enhance adaptive capacity of rural communities? In what way?	Yes, by enhancing: • community water access • community climate change awareness • community problem-solving capacity through adaptive management • collective action (particularly in relation to the water committee)	Yes, by enhancing: • community water access • community climate change awareness • community problem-solving capacity through adaptive management • community ability to host other neighbouring communities for traditional activities	Yes, by: • controlling erosion that was encroaching very close to some homes • raising awareness on climate change • encouraged collective action

Table 9 Vanuatu Capacity Building for the Development of Adaptation Measures (CBDMPIC) project assessment

Was the project successful in achieving its objectives? In what way?	Successful Significantly improved community water supply Relocated entire community to area less prone to flooding, although occasional flooding still present and some desire to further relocate some households Good community participation in relocation process
What were the drivers to success?	Visible and fairly urgent need for relocation Community had begun to prepare for relocation independently of the project Through participatory methods, project addressed water supply—a previous barrier to independent relocation Proactive change agents Good community cooperation with each other and with project implementers
What were the barriers to success?	Isolation and difficult accessibility limits sustained support by project implementers/external support groups No financial or social mechanisms set up for community water tank maintenance Some internal community rifts limited collective decision-making about relocation site

Did the project enhance adaptive capacity of rural communities? In what way?	In part, by: • increasing community water access • demonstrating adaptation options • increasing visibility of the Torres islands, nationally, regionally and globally

Table 10 AusAID Pacific Vulnerability and Adaptation Project assessment

	Funafuti	Lofeagai
Was the project successful in achieving its objectives?	Successful • Improved the community water supply with 'water tanks' • Strong support from the local government and NGOs	Successful • Improved the community water supply with 'water tanks' • Strong support from the local government and NGOs
What were the drivers to success?	• Urgent need for cleaner drinking water • Water supply and storage capacity has increased since 2008 after good awareness and mutual vision between community, NGOS and the local government • Community elders (*Falekaupule*) are generally good visionaries and welcome views of youth and government on pressing issues • Accessibility by project personnel • Good level of traditional knowledge on survival techniques and how it complemented 'modern' technology	• Community cooperating with project team and local government • Accessibility by project personnel • Urgent need for cleaner drinking water • Ability to marry traditional and modern skills for adaptation
What were the barriers to success?	• Though project has assisted with purchase of tanks, there still are problems with proper rainwater catchments • Water stealing – especially during drought • Population growth and influx into capital – unhealthy living due to congested space • Abuse of water (flush toilets, washing machines etc.)	• Vague structure of governance in this community • Majority are from outer islands and leasing land • Population growth and influx into capital – unhealthy living due to congested space • Abuse of water (flush toilets, washing machines etc.)
Did the project enhance adaptive capacity of rural communities? In what way?	• Enhanced water access • Collective action enhanced particularly between the project, community, government and partners • Greater awareness on climate change and proactive approach techniques using traditional and modern knowledge/skills	• Enhanced water access • Collective action enhanced particularly between the project, community, government and partners • Greater awareness on climate change and proactive approach techniques using traditional and modern knowledge/skills.

Red Cross preparedness for climate change programme assessment

It is too early in the project life to assess its success and impact on the adaptive capacity of rural communities. However, the SIRC believes that the project changed the community decision-making process in a positive way and believes that the Vulnerability and Capacity Assessment process was a good example of how the community can work and make decisions together.

Regional adaptive capacity

Given the small population of many Pacific island countries, many matters are coordinated at the regional level via government-member agencies, such as the SPC now including the formerly separate Pacific Islands Applied Geoscience Commission (SOPAC) (a review of regional agencies has led to SOPAC becoming a division of SPC from 2010 rather than a separate organisation), SPREP, the Forum Secretariat, the USP and others. These agencies have established spheres of influence but these have blurred over the years, especially for broad topics such as climate change. The UNFCCC grew out of the United Nations Conference on Environment and Development meeting and Pacific Island Government implementation of the conventions is thus administered by SPREP.

However, sectoral matters may come under different agencies (e.g. SPC for fisheries, Forum for political matters, USP for capacity building). There is a coordinating body for these agencies, the Council for Regional Organisations of the Pacific and also for climate change regionally (the Climate Change Roundtable), but these bodies have not perhaps been as effective as is needed. For example, there is an essential need to coordinate the many agencies that deal with food security in the region.

A recent review of SPREP contained a number of recommendations to strengthen its work. Among other activities, SPREP has obtained a number of large GEF grants for multi-country projects, two for climate change. The review highlighted that generally it was difficult to effectively and efficiently administer country-based projects from a regional agency, especially when it follows a ‘one-size fits all’ approach. The Year 1 review of current PACC Project has again highlighted shortcomings in its implementation. Such regional projects do bring useful funds into countries but we need mechanisms to increase the usefulness.

USP has recently been asked to implement a regional Africa Caribbean Pacific – European Union project on community CCA (8 million Euros); their intention is to be flexible in supporting the different priorities of each country.

At a sectoral level, some good work has been done by SPC on developing crops that are adaptable to a changed climate; SOPAC has also assisted many communities to better understand hydrology and coastal erosion. Such useful information needs to be understood and utilised at the community level.

Climate change adaptation has been a globally discussed concern for over three decades, but it has only been endorsed by GEF for funding for a fairly short period. The presence of regional organisations and some coordinating mechanisms are valuable assets; how they can contribute to CCA needs to be improved. Cooperation

mechanisms need to be discussed to improve their effectiveness. Similar to the Climate Change Roundtable, there is a Roundtable for Nature Conservation as well as other regional forums such as the Pacific Disaster Risk Management Partnership Network. The Roundtable for Nature Conservation has improved its effectiveness recently by agreeing to partner, on a rotating basis, with different Pacific countries in ensuring their National Biodiversity Strategy Action Plans become strategic and have annual work plans with implementation monitored annually. Large conservation NGOs partially fund this work. A similar support module for CCA would be appropriate.

National adaptive capacity

Comparing one country to another can be tricky; especially when it might be used as a basis for allocating funds.

It seems clear from the literature that different countries have shown different interest in committing resources to the UNFCCC process. This is clearly a national decision that countries have the right to make. Considering the eight countries covered by this work, evidence suggests that Palau and the Solomon Islands have perhaps done less to develop their capacity for CCA.

For the Solomon Islands this seems due to the civil unrest and its aftermath. Palau has been fairly selective about which multilateral environmental agreements it commits itself to sign and implement. Despite being less active in the UNFCCC processes, Palau's basic environmental management system is sound. Kiribati, Cook Islands and Samoa seem to have been proactive in developing all-of-government approaches to CCA and developed many of the required functions for it; Vanuatu and Tuvalu also have a fairly positive evaluation. Fiji has made considerable efforts but perhaps could do more. Only in 2011 did Fiji start developing a strategic plan for CCA and its coordinating committee for climate change has not always met on a regular basis. That more of the responsibility for climate change went from the Department of Environment to the Prime Minister's Office in October 2011 may be a reflection of this.

Note: The average of the scores from key informants for the different functions suggested by the WRI is given in Table 11. It is up to AusAID whether it should be released in addition to the more qualitative assessment above, as the publication of such a table could invite rancour.

Table 11 National adaptive capacity assessment based on WRI function-based analysis framework

1. Assessment	3	4	2	3	3	4	2	2
2. Prioritisation	2	4	4	3	4	4	3	3
3. Coordination	2	3	4	3	4	3	3	3

4. Information	2	2	1	2	3	2	1	2
5. Climate risk reduction	2	4	2	2	2	2	1	2
Country average	2.2	3.4	2.6	2.6	3.2	3.0	2.0	2.4

It is noted that although capacity often suggests some inherent characteristic, in the national case it more reflects capability functions that countries should be able to perform if the function is prioritised and capacity built to carry it out. This is thus a potential focus for external assistance. It should also be noted that national adaptive capacity is related to some of the community factors, and for many countries the relative scores correlate well.

5. Conclusions and recommendations

Comparing this study with other studies

The emerging thinking in the Pacific by Australian academics with extensive experience in the Pacific, such as Barnett and Campbell, emphasises the importance of networks and relationships (often called social capital) in addressing climate change. As these are core to Pacific traditional society, it is not surprising that the score on 'traditional values' was high at almost all sites. In general human capital and social capital are strong across the sites; this suggests that people have the ability and the connections to adapt to climate change. This is supported by the excellent success of community-based resource management work in the last decade that utilises these skills and personal networks. The weakest factors are infrastructure and support services; this reflects the weakness and lack of resources in providing these services by the national governments. Care should be exercised in trying to improve these areas. Communities should be consulted on priority areas for improvement. Core services such as water and sanitation and possibly electricity underpin multiple goals and should be considered for support.

For many factors, the standard deviation is fairly low; scores are reasonably uniform across sites. These include the highly rated areas: skills, tradition, food resources and access to information are uniformly high across all sites. Support services is moderate to low across all sites. Factors such as land availability, income, infrastructure and services, and history of adaptation projects have quite significant variability across the countries studied. Uniformity may indicate qualities likely to exist across the Pacific, whereas more variable ones are likely to vary based on local factors. Two countries had multiple sites; factors that varied considerably within country were collective action, leadership, income and infrastructure and support services.

Implication for effective support to climate change adaptation

How should the information in this report be used in making decisions about the types of CCA projects that should be supported and where. It could be argued that communities with low adaptive capacity are less likely to make good use of project funding and that most need their adaptive capacity improved. Much experience in the Pacific suggests that in such a situation (i.e. sites with low adaptive capacity) efforts specifically focused on improving adaptive capacity in key areas should be undertaken before committing major project funding.

Not all classes of factors are equally important for effective adaptation. Social and human capital factors are arguably the most important in the Pacific; cooperative relationships greatly increase the chance for positive action. Participatory approaches that enhance social capital (as well as human capital) are critical for community projects. In looking at the projects reviewed in this study, the authors agreed that having good community leadership and governance structure were likely the most important factors for a sustainable project. This suggests that enhancing these should be a key component of any community project. In addition, projects that specifically target leadership and governance are important to consider for funding, even under a CCA window.

Additionally, the PACAF approach used for this study has great potential as a tool to measure adaptive capacity 'before, during and after' a project. The basic factors included in the PACAF could also be used as a basis for designing a much more in-depth and participatory assessment and for project design purposes. However, the methodology applied to the framework would not be appropriate by itself for project design. It was an attempt to develop a framework that could measure the qualitative and difficult-to-measure aspects of adaptive capacity that are fundamental in the Pacific (such as traditional knowledge, self agency, collective action). They would therefore be useable in projects by implementing agencies that have little time for in-depth analysis.

At the national level, support for the core functions are in many ways similar to what is needed at the community level:

- appropriate information to inform decision-making
- strategic and participatory planning which leads to partnerships committed to implement priority actions on the ground
- an adaptive management approach that has a simple monitoring plan and regular reflection on effectiveness of actions and how priorities might be changing.

At the regional level, support for governments to be able to effectively carry out these roles is a key need.

The Pacific islands are greatly challenged by climate change, but at the same time have great potential to adapt.

References

Adger, W.N., Huq, S., Brown, K., Conway, D. and Hulme, M. 2003: Adaptation to climate change in the developing world. *Progress in development studies* 3(3), 179-195.

Adger, N., Agrawala, S., Mirza, M., Conde, C., O'Brien, K., Pulhin, J., Pulwarty, R., Smit, B., Takahashi, K. 2007: Assessment of adaptation practices, options, constraints and capacity In: Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., Hanson, C.E. (eds). *Climate Change 2007: Impacts, adaptation and vulnerability.* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, UK: Cambridge University Press; 2007, 717–743.

Adger, W.N. and Kelly, P.M. 1999: Social vulnerability to climate change and the architecture of entitlements. *Mitigation and Adaptation Strategies for Global Change* 4(3-4), 253-266.

Adger, W.N. and Vincent, K. 2005: Uncertainty in adaptive capacity. *Geoscience* 337, 399-410.

Allen, K. 2003: Vulnerability reduction and the community-based approach. In Pelling, M. (ed.), *Natural disasters and development in a globalizing world*. London, New York: Routledge, 170-184.

Barnett, J. 2001: Adapting to climate change in Pacific island countries: the problem of uncertainty. *World Development* 29(6), 977-993.

Brooks, N. 2003: *Vulnerability, risk and adaptation: a conceptual framework. Tyndall Centre working paper no. 38*. Norwich. University of East Anglia.

Brooks, N. and Adger, W.N. 2004: Assessing and enhancing adaptive capacity. In Lim, B., Spanger-Siegfried, E., Burton, I., Malone, E. and Huq, S.(eds), *Adaptation policy frameworks for climate change: developing policies, strategies and measures*. Cambridge: Cambridge University Press, 165-182.

Burton, I. 2009: Deconstructing adaptation ... and reconstructing. In Schipper, E.L.F. and Burton, I. (eds), *The Earthscan reader on adaptation to climate change*. London, Sterling: Earthscan, 11-14.

Cutter, S.L. 1996: Vulnerability to environmental hazards. *Progress in Human Geography* 20, 529-539.

Ensor, J. and Berger, R. 2009: Introduction: understanding community-based adaptation. In Ensor, J. and Berger, R. (eds), *Understanding climate change adaptation: lessons from community-based approaches*. Rugby: Practical Action Publishing Ltd, 3-20.

Eriksen, S.H. and Kelly, P.M. 2007: Developing credible vulnerability indicators for climate adaptation policy assessment. *Mitigation and Adaptation Strategies for Global Change* 12, 495–524.

Few, R. 2003: Flooding, vulnerability and coping strategies: local responses to a global threat. *Progress in development studies* 3, 43-58.

Ford, J.D. and Smit, B. 2004: A framework for assessing the vulnerability of communities in the Canadian Arctic to risks associated with climate change. *Arctic* 57(4), 189-401.

Fussel, H.M. and Klein, R. 2006: Climate change vulnerability assessments: an evolution of conceptual thinking. *Climatic Change* 75 301-329.

Gallopin, G.C. 2006: Linkages between vulnerability, resilience, and adaptive capacity. *Global Environmental Change* 16(3), 293-303.

Hay, J.E. 2009a: Assessment of Implementation of the Pacific Islands Framework for Action on Climate Change (PIFACC). Prepared for the Pacific Climate Change Roundtable (PCCR) and the Secretariat of the Pacific Regional Environment Programme (SPREP), 20pp.

Hya, J.E. 2009b: Implementation of the Pacific Adaptation to Climate Change (PACC) Project: Process, Status and Assessment. Technical Report. Prepared for the Secretariat of the Pacific Regional Environment Programme (SPREP), 48pp.

Handmer, R. 2003: Adaptive capacity: what does it mean in the context of natural hazards? In Smith, J.B., Klein, R.J.T. and Huq, S. (eds), *Climate change, adaptive capacity and development*. London: Imperial College Press, 51-70.

Hewitt, K., (ed.) 1983b: *Interpretations of calamity: from the viewpoint of human ecology*. Boston: Allen and Unwin.

Huq, S. and Reid, H. 2004: Mainstreaming adaptation in development. *Institute for Development Studies Bulletin* 35, 15-21.

Lavell, A. 2004: The lower Lempa River valley, El Salvador: risk reduction and development project. In Bankoff, G., Frerks, G. and Hilhorst, D. (eds), *Mapping vulnerability: disasters, development and people*. London, Sterling: Earthscan, 67-82.

Lopez-Marrero, T. and Yarnal, B. 2010: Putting adaptive capacity into the context of people's lives: a case study of two flood-prone communities in Puerto Rico. *Natural Hazards* 52(2), 277-297.

Magnan, A. 2010, For a better understanding of adaptive capacity to climate change: a research framework. *Climate,* Institut Du Developpement Durable et Des Relations Internationales (IDDRI).

Margoluis R. and Salafsky R., 1998: *Measuring success: Designing, managing, and monitoring conservation and development projects,* Island Press.

Ministry of Health, 2004, *National Nutrition Survey*, Ministry of Health.

Moser, S. and Ekstrom, J. 2010: A framework to diagnose barriers to climate change, *PNAS*, 107(51): 22026-22031.

Nelson, D.R., Adger, W.N. and Brown, K. 2007: Adaptation to environmental change: contributions of a resilience framework. *Annual Review of Environmental Resources* 32, 395-419.

O'Brien, K., Quinlan, T. and Ziervogel, G. 2009: Vulnerability interventions in the context of multiple stressors: lessons from the Southern Africa Vulnerability Initiative (SAVI). *Environmental Science & Policy* 12, 23-32.

Ravuvu A., 1985, *Fijian ethos as expressed in ceremonies*, PhD Thesis submitted to University of Auckland.

Reid, P. and Vogel, C. 2006: Living and responding to multiple stressors in South Africa—Glimpses from KwaZulu-Natal. *Global Environmental Change* 16(2), 195-206.

Smit, B., Burton, I., Klein, R. and Wandel, J. 2000: An anatomy of adaptation to climate change and variability. *Climatic Change* 45, 223-251.

Smit, B. and Pilifosova, O. 2001: Adaptation to climate change in the context of sustainable development and equity. In McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J. and White, K.S.(eds), *Climate Change 2001: impacts, adaptation and vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

Smit, B. and Pilifosova, O. 2003: From adaptation to adaptive capacity and vulnerability reduction. In Smith, J., Klein, R.T.J. and Huq, S. (eds), *Climate change, adaptive capacity and development*. London: Imperial College Press, 9-28.

Smit, B. and Wandel, J. 2006: Adaptation, adaptive capacity and vulnerability. *Global Environmental Change* 16, 282-292.

Wisner, B. 2004: Assessment of capability and vulnerability. In Bankoff, G., Frerks, G. and Hilhorst, D. (eds), *Mapping vulnerability: disasters, development and people* London: Earthscan, 183-194.World Bank, 2007, *Stocktaking progress on integrating adaptation to climate change into development cooperation activities*. World Bank. (www.oecd.org/dataoecd/33/62/39216288.pdf)

World Resources Institute (WRI), 2009: *The national adaptive capacity framework: Key institutional functions for a changing climate*, World Resources Institute. (http://www.wri.org/project/vulnerability-and-adaptation/nac-framework)

Yohe, G. and Tol, R.S.J. 2002: Indicators for social and economic coping capacity - moving toward a working definition of adaptive capacity. *Global Environmental Change* 12, 25-40.

Yohe, G.W., Lasco, R.D., Ahmad, Q.K., Arnell, N.W., Cohen, S.J., Hope, C., Janetos, A.C. and Perez, R.T. 2007: Perspectives on climate change and sustainability. In Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J. and Hanson, C.E.(eds), *Climate change 2007: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* Cambridge: Cambridge University Press, 811-841.

ATTACHMENT A: PACAF FRAMEWORK

FACTOR 1: HUMAN CAPITAL

CATEGORIES

1(A) Skills: traditional and modern

- What is it?
  Community capacity and knowledge to assist in projects: 'Traditional skills' refers to practices derived from indigenous/local knowledge. This is different to broader traditional values examined in category 3(A). 'Modern skills' refer to skills that are derived from external knowledge. Most skills (especially useful ones) will be a combination of both. The skills we refer to here are a) those relevant to specific sectors (like technical expertise in water sector) and b) general project implementation skills (for example, assessment and M&E skills that can complement skills of external agencies).
- How does it affect A/C?
  An abundance of relevant traditional skills indicates a high level of in-community options to deal with climate problems in a sector that can be complemented by external skills (also triangulates 3(F) and 5(A). A high level of modern skills to assist in projects increases A/C.

1(B) Health Security

- What is it?
  The physical health and wellbeing of the community.
- How does it affect A/C?
  Higher health security means higher A/C because sick people are less able to implement projects and initiatives and less time is available to dedicate to vulnerability reduction initiatives.

1(C) Change Agents

- What is it?
  The presence of creative, 'ideas persons' in the community that initiate and motivate initiatives and projects.
- How does it affect A/C
  This could increase A/C.

FACTOR 2: SOCIAL CAPITAL-COMMUNITY COHESIVENESS

CATEGORIES

2(A) Community diversity

- What is it?
  Community diversity refers to: number of immigrants, number of *mataqali*/clans and *vasu*/ households without ancestral access to resources, number of religions, and educational and economic equality in a community.
- How does it affect A/C?
  A relatively low diversity of the above mentioned factors could indicate higher adaptive capacity because it is likely to indicate: high collective action and identity, b) cohesive leadership, and c) even distribution of access to resources. However, the way in which diversity is MANAGED within the community is also important to adaptive capacity – a community may be highly diverse for example, but this may be managed well by a good leadership system which ensures all households are resource secure. Examining community diversity IN CONJUNCTION with 2(B) (Leadership), 2(C) (collective action) 2(F) (governance) and 4(A)(access to land), will enable an assessment of this.

2(B) Leadership

- What it is?
  A person(s) who create a positive vision for community and effectively implements projects reflecting it.
- How does it affect A/C?
  Strong leadership increases A/C.

2(C) Strength of Vanua Collective Action

- What is it?
  The ability of the community to regularly work together to achieve community goals and the sense of collective identity that a community feels reflects this. Collective action capacity is also reflected in the number of community groups who have clear roles and responsibilities for key areas and produce effective results
- How does it affect A/C?
  Good collective action capacity increases A/C.

2(D) Support Services and Networks

- What is it?
  Community ability to access assistance from a wide range of groups.
- How does it affect A/C?
  Increases A/C.

2(E) Good Governance

- What is it?
  Community decision-making and implementation processes that are effective within the cultural context. In most cases this will include appropriate input of village people into decision making and sharing of information needed for this.
- How does it affect A/C?
  Good governance should increase A/C.

FACTOR 3: BELIEF SYSTEMS/WORLD VIEWS/VALUES

CATEGORIES

'Mana' (Fiji) (Also linked with Factor 8: Approaches by institutions) NOW IN 3A BELOW

3(A) Traditional values, systems and knowledge ('Mana')/Modern, Western and Church value systems and knowledge

- What is it?
  'Traditional' refers to value systems and worldviews that are strongly shaped by accumulated, indigenous cultural knowledge. 'Modern/'Western'/'church' refers to value systems that are strongly shaped by Western knowledge. Value system adherence (traditional or modern) creates social capital by guiding behaviour, shaping identity and building cohesive social groups. Different Church denominations are likely to affect how people perceive the world they live in. Different denominations place different values on tradition.
- How does it affect A/C?
  Strong presence of traditional values in day to day life indicates higher adaptive capacity because it indicates: a) abundance of relevant traditional skills (1A), b) stronger collective identity c) more cohesive social groups d) fewer rifts in the community. A solid presence of traditional values is likely to indicate a better ability to 'indigenize' modern, Western and Church-related values and knowledge, and therefore effectively adapt 'new' ways of doing things to an appropriate cultural context.

  These attributes are likely to increase decision making and implementation capacity. It may also indicate a higher retention of subsistence food production practices. A high level of traditional knowledge will indicate better adaptive capacity.

  Denomination may determine people's belief in climate change and willingness to create/adopt solutions. Missionary history may determine level of value still placed on traditional knowledge.

3(B) Willingness to accept change

- What is it?
  The willingness of the community to take on changes in order to deal with problems, improve situation etc.
- How does it affect A/C?
  New ways of dealing with old and new problems could be hindered by a lack of acceptance of new ways of doing things. Conversely, if ways of dealing with problems are retained that are based on traditional practises they may be successful in dealing with the impacts of climate change. Examine in conjunction with 3(A).

3(C) Self agency vs determinism

- What is it?
  Perceptions of self-agency. Belief system may be fatalistic (ie. Have no agency to control the future, future is determined by forces beyond human control) or

on the other end of the spectrum, people may believe in self-agency, or their ability to change the future

- How does it affect A/C?
  This could be a factor in determining whether people believe that climate change is possible and caused by humans. It may also determine whether people are proactive and anticipatory, or reactive. In a very general sense, more belief in self-agency will indicate higher adaptive capacity.

3(D) Here & Now/Future thinking (Strongly linked with 3(C))

- What is it?
  Short term vs. long term thinking and actions. Linked to being either a believer of fate (i.e. Just being here and now) or a believer that we have control over our futures (longer term perspective)
- How does it affect A/C?
  In general, long term thinking indicates higher adaptive capacity because it is more likely that proactive actions to reduce future risks will be taken. Climate change is changes in averages over time which requires forward planning and action based on uncertainty. Given these challenges alone, addressing current climate risks experienced now is the first step towards addressing climate change and will put it in context for people.

3(E) Dependence (government, aid, remittances) vs. independence

- What is it?
  A gauge of the attitude of the community in response to stressors: does the community wait for assistance to come or initiate action themselves? This also triangulates 3(C) (self agency) as it reflects confidence in abilities to be self sufficient.
- How does it affect A/C?
  A 'dependency culture' may eventuate from being reliance on aid, government assistance and remittances and people may lose the skills to help themselves. Being independent may enable people to be resourceful, take their own initiative, retain traditional practises that deal with stressors etc. However, a largely independent community may not receive information/external assistance to assist in times of stress or be receptive to it.

FACTOR 4: RESOURCES AND DISTRIBUTION

CATEGORIES

4(A) Land

- What is it?
  The availability of land to use for subsistence needs and the distribution of it
- How does it affect A/C?
  Assume that having sufficient land made available to use for subsistence needs can increase adaptive capacity. Fairly equal distribution of access will indicate higher ac.

4(B) Fishing

- What is it?
  The availability of fishing area to catch fish for subsistence needs/access to fish for food

- How does it affect A/C?
  Assume that having rich fishing grounds made available to use for subsistence needs can increase adaptive capacity. Fairly equal distribution of access will indicate higher ac.

4(C) Income

- What is it?
  The amount of disposable income available to purchase basic needs and the distribution of it within the community
- How does it affect A/C?
  Assume that the amount of disposable income available to purchase basic needs can increase adaptive capacity. A fairly equal distribution will indicate higher ac.

4(D) Infrastructure and Services

- What is it?
  Infrastructure includes accessibility to health services, electricity, transport, telecommunication, main roads linking the village to other areas, shops, schools. Distribution of access to infrastructure
- How does it affect A/C?
  Assume that having fairly equal accessibility to infrastructure can increase adaptive capacity.

4(E) Drinking Water

- What is it?
  Drinking water includes the supply of safe drinking water made available through pipes, wells or tanks.
- How does it affect A/C?
  Assume that having accessibility to drinking water can increase adaptive capacity.

FACTOR 5: OPTIONS

CATEGORIES

5(A) Adaptation possibilities (can be sector specific)

- What is it?
  Possibilities available to and accessible by communities that will empower communities to learn how to adapt. This focuses on externally conceived options and in particular on technology transfer, innovations and possible relocation options
- How does it affect A/C?
  More options available and ease of access to them will increase adaptive capacity.

5(B) Livelihood options

- What is it?
  The ability of communities to derive income in the face of climate changes. The diversity of means to earn income within a community is an important component of this.
- How does it affect A/C?
  Increased available options (diversity) and ability to derive income will increase adaptive capacity

5(C) Food acquisition options

- What is it?
  Means of access to and availability of a variety of safe food options or sources for communities (including subsistence, imported, famine foods etc.)
- How does it affect A/C?
  More safe food options will increase adaptive capacity.

FACTOR 6: INFORMATION AWARENESS

CATEGORIES

6(A) Access/level of access to relevant information, and

- What is it?
  Awareness of, or locally experienced, global warming and climate changes. Linking climate change into people's own thinking. General understand of climate change impacts on various sectors of community life
- How does it affect A/C?
  Theoretically, a higher level of awareness on the science of climate change causes, and potential impacts and adaptation measures is reflective of the community's ability to make informed decisions on appropriate solutions to reduce their vulnerability to climate change. However, we feel that often too much emphasis is placed upon the role of climate information in local adaptive capacity and that access to 'scientific' climate information and predictions does not have as much impact on adaptive decision making at the local scale as is commonly thought. This links into belief systems and world view (3(C), 3(D).

6(B) Ability to analyse information/options

This section will build upon Factor 5(A), and Factors 6(A) and (B). In a focus group, participants will be asked to give various adaptation options for an issue such a water supply and the advantages and disadvantages of these (based on sector of focus)

6(C) Communicated risks and importance

- What is it?
  The role of external communication of risks
- How does it affect A/C?
  Better risk communication means higher adaptive capacity.

FACTOR 7: HISTORY OF DEALING WITH CLIMATE STRESSES

CATEGORIES:

7(A) Past experience of dealing with climate events

- What is it?
  Community experience of, and ability to 'deal with', periods of significant change and disruption such as cyclones, droughts and floods. Non-climate periods of disruption and change are also important to consider (for example, disease outbreak, earthquake, taro blight year) as much of the capacity employed to deal with these will also relate to climate-related adaptability.

- How does it affect A/C?
  A history of dealing with climate events may equip communities with skills, knowledge, institutional arrangements and mechanisms for dealing with future climate stresses. A history of effectively dealing with climate stresses may therefore indicate high adaptive capacity. A history of effectively dealing with changes and disruptions in general may also indicate high adaptive capacity. On the other hand, a history of not effectively dealing with climate stresses may reduce adaptive capacity by generating despondency and 'psychological dependency'.

ATTACHMENT B: Household survey questionnaire

PART ONE

SECTION 1: GENERAL INFORMATION

Surveyed by:_____ Date:_____ Time:_____ Location:_____Village:_____ Respondent's name: _____ Household clan/*mataqali*/family:_____ No. of household members:_____

i. Please provide the following information for the interviewee. 'Interviewee' is the person appointed by the household to do most of the talking. For efficiency, this section could be filled in separately by an assistant prior to the main questionnaire interview.

Name	Sex	Year of birth	How long lived in village	Occupation (fisherman, farmer, household manager, student, small business operator, pastor, etc.)	Literacy (read/write)	Highest level of education	Special skills	Religion
1. Interviewee:								

Obtain information about the interviewee's household. Information about each household's composition may be held by the village headman (the *volanikawabula* in Fiji). If this is available, fill in as much information as possible in the table below yourself for each household.

Name	Sex	Year of birth (if known)	How long lived in village	Occupation (fisherman, farmer, household manager, student, small business operator, pastor, etc.)	Literacy (read/write)	Highest level of education
2.						
3						
4						
5						
7						
8						
9						
10						

If this information is not available, ask the interviewee for the following information:

iia. How many people slept in this house last night? _____

iib. Of these, how many are people that normally sleep here?

iic. For people that normally sleep in the house, fill in the table below:

	Sex	Age
1		
2		
3		
4		
5		
6		

iii. Are there members of your family who now live in Suva/Port Vila (or insert as appropriate) or other towns for work or study?
Yes_____ No _____

If yes, how many? _____

iv. BRIEF DESCRIPTION OF HOUSE (interviewer to fill in by himself or herself):
TICK THE CORRECT RESPONSE

Questions	YES	NO
Is the house predominantly local materials (bamboo, thatch, wood)?		
Is the house predominantly non-local materials (iron, concrete, planks, tiles)?		
Is the house both local and non-local materials?		
Does household own a television?		
Does the household have a radio?		
Does the household have a gas stove?		
Does the household have running water?		

SECTION 2: ACCESS TO RESOURCES

(WATER)

1a. Where does your drinking water come from? (Write X in the box that best matches answer. If “others”, describe them)

Community tank	
Household/family tank	
Well	
Pump	
Spring	
Bore hole	
Stream/river	
Other	

1b. Is safe drinking water always available to your household?

Yes_____ No_____ Sometimes_____

1c. If no or sometimes, why? (Write X in the box that best matches answer. If “others”, describe them)

Not enough tanks/pipes/wells	
Water management problems	
Unclean water source	
Low rainfall	
Not enough during dry season	
Other	

1d. Has the project affected your access to safe drinking water?
Yes____No____ Yes and No___ I don’t know___

1e. If so, how?
_____
_____
_____
_____

(FOOD)

2a. Does your household have access to fishing grounds?

Yes_____ No_____

2b. If yes, are you generally able to catch enough fish to meet your household’s food needs?

Yes_____ No_____ Sometimes _____

2c. Do you have access to enough land to provide for your household's food needs?

Yes_____ No_____

Comments_____
_____
_____

2d. What are the sources of food for your household? (Write X in the box that best matches answers. If "others", describe them and rank the 3 main food sources)

	Food source?	What are the 3 main food sources (1=most important; 2 = second most important; 3 = third most important)
Gardens		
Tree crops		
Bush		
Fishing		
Hunting		
Livestock		
Intra-community trade		
Community store/imported food		
Remittances (food sent from family elsewhere)		
Famine food (preserved, special gardens etc.)		

2e. Has the project affected your family's access to food?

Yes____No____ Yes and No___ I don't know___

2f. If so, how?

_____
_____
_____
_____

(CASH INCOME)

3a. What are the sources of cash income for your household? (Write X in the box that best matches answers. If "others", describe them and rank main 3 sources of income)

	Income source?	What are the 3 main income sources (1=most important; 2 = second most important; 3 = third most important)
Fishing		
Agriculture		
Casual wage labour		
Salary in village		

Salary in town (insert name)		
Handicraft work		
Pension		
Remittance		
Small business (community store, kava retail, cigarette retail, etc)		
Other (specify)		

3b. What is your average monthly cash income (including remittances)? Is it…..? (read out the scales rather than asking them for an exact amount) (adjust for relevance)

1	Less than $100	
2	$100-$200	
3	$201-$300	
4	$301-$400	
5	More than $401	

3c. Has the project affected your access to cash income?

Yes____No____ Yes and No___ I don't know___

3d. If so, how?

_____

_____

_____

_____

SECTION 3: DEALING WITH ADVERSITY

4a. What problems do you experience related to the climate/weather? (Read out and write yes or no). Which are the three worst problems? (Mark in table below)

	Yes or no	Three worst
Flooding		
Inundation		
Lack of water		
Cyclones/ hurricanes		
Heavy rains		
Drought		
Coastal erosion		
Riverbank erosion		
Declining fish and seafood stock		
Decline in agricultural food production		
Coral bleaching		
Reef degradation		
More sickness/illness/diseases		
Loss of homes		
None		
Other (specify):		
Others:		

Others:		
Others:		

4b. Do you experience these three problems: (Read out)

1	More than once per year	
2	Once per year	
3	Once every couple of years	
4	Once every few years	
5	Once every decade or less	

4c. How does the village deal with these problems (base on problems identified above)? (List and note how many options are 'technological' and/or externally initiated)

_____
_____
_____
_____
_____
_____

4d. Is it easy to get assistance from external organisations to help the village deal with these problems (for each of the three problems listed in 5a)?

Yes_____ No_____ Sometimes _____ Don't know_____

Comments_____
_____
_____
_____
_____
_____

4e. Has the project affected your ability to deal with climate/weather related problems?

Yes____No____ Yes and No___ I don't know___

4f. If so, how?

_____
_____
_____
_____

4g. Has the project affected your ability to access assistance from external organizations to help solve community problems?

Yes_____ No_____ Sometimes _____ Don't know_____

4h. If so, how?

_____
_____

SECTION 4: SOCIAL AND HUMAN CAPITAL

5a. Do people in the village work together to solve problems?

1	Never	
2	Hardly ever	
3	Sometimes	
4	Often	
5	Very often	

5b. Do community leaders play an important role in solving community problems?

1	Never	
2	Hardly ever	
3	Sometimes	
4	Often	
5	Very often	

5c. Comments (optional)?

5d. Has the project affected the ability of the community to work together?

Yes____No____ Yes and No___ I don't know___

5e. If so how?

5f. Has the project affected community leadership?

Yes____No____ Yes and No___ I don't know___

5g. If so how?

6a. Which village committees are you aware of? (list)

_____
_____
_____

6e. Is anyone in your household involved in a village committee?

Yes_____ No_____

If yes, go to question 6f. If no, go to question 6a.

6f. What is the committee responsible for? (List and note any lack of clarity)

_____
_____
_____

6g. Which projects has the committee been involved with? (List)

_____
_____
_____
_____

7a. Do you think the community values traditional knowledge and ways of life? (Read out)

1	Not at all	
2	A little	
3	Sometimes	
4	Quite a lot	
5	A lot	

7b. Does the community value traditional knowledge and ways of life more or less in comparison to 20 years ago?

More _____ Less_____ The same_____ Don't know_____

PART TWO

Explain that in the remainder of the interview you will give the participant some statements and ask their opinion on whether they agree or disagree. If the participant volunteers an explanation, record some brief notes in the 'comments' space below each table.

SECTION 5: BELIEFS AND WORLDVIEWS

	Now I will read a list of statements about belief systems and worldviews in the community. Can you indicate whether you agree or disagree with each statement? [Tick one option for each statement]	Agree	Disagree	Neutral	Don't know
7	We have no control over our future				
8	Taking actions now will prevent problems in the future				
9	New ways of solving problems are always accepted by the community				
10	The community often plans for the future				

Comments_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

ATTACHMENT C: National Assessment Functions

Assessment Function
A. To what extent has a national vulnerability and impacts assessment been conducted?- UNFCC documents for all countries
B. To what extent have existing adaptation efforts been systematically inventoried?
C. Is there an assessment of climate risks to priorities in major existing national planning documents?
D. Is there a system in place for regularly updating the above assessments in the future?
Prioritisation Function
A. To what extent have national priorities for adaptation been identified?
B. To what extent is there a system in place for reviewing and adjusting priorities over time?
Coordination Function
A. Have key services, sectors or activities been identified where coordination may be needed for successful adaptation?
B. Has an authoritative body been tasked with adaptation coordination?
C. To what extent have clear coordination processes been established?
D. To what extent do conditions allow coordination to improve over time?
E. To what extent is the coordination mechanism functioning effectively?
Information Function
A. To what extent are there appropriate systems for data gathering?
B. To what extent are there appropriate systems for information analysis?
C. Has an appropriate national platform (or network) for public information sharing on adaptation been identified (or created)?
D. To what extent is relevant information reaching key stakeholders who need it?
Climate Risk Reduction Function
A. To what extent has climate risk been assessed for the priority area?
B. Have adaptation options for the given priority area been thoroughly considered?
C. To what extent are selected adaptation options implemented on the ground?