

Beyond the core: environmental decision-making among peripheral communities in Pacific Island Countries

Patrick D. Nunn **[CORRESPONDING AUTHOR]**
School of Behavioural, Cognitive and Social Sciences
The University of New England
Armidale
New South Wales 2351
Australia

Email: punn3@une.edu.au
Telephone: +61 2 6773 3012
Fax: +61 2 6773 3820

William Aalbersberg
Institute of Applied Sciences
Faculty of Science, Technology and Environment
The University of the South Pacific
Suva
Fiji Islands

Shalini Lata
Department of Psychology
School of Behavioural, Cognitive and Social Sciences
The University of New England
Armidale
New South Wales 2351
Australia

Marian Gwilliam
Secrétariat de RAMSAR
Rue Mauverney 28
CH-1196 Gland
Switzerland

Abstract

Pacific islands are highly exposed to climate change. Most impact studies have focused on the most densely-populated core areas where top-down governance is most effective. In contrast, this research looks at peripheral (rural/outer-island) communities where long-established systems of environmental governance exist that contrast markedly with those to which governments and their donor partners in this region have preferred. Despite 25-30 years of assistance, there has been negligible effective and sustainable adaptation for climate change in peripheral parts of Pacific Island Countries, something that is due to both the ineffectiveness of top-down approaches in such places as well as a lack of attention to the nature and the context of climate-change communications.

Peripheral communities in the Cook Islands, Fiji, Kiribati and Vanuatu were studied. Traditional systems of environmental governance in peripheral parts of these four countries are described and three key barriers to adoption of effective and sustainable climate-change adaptation identified. The first is the lack of awareness among key decision-makers about climate change and environmental sustainability, which could be lessened by targeted awareness-raising. The second is the inappropriateness of traditional decision-making structures for dealing with both the complexity and the probable future acceleration of climate-driven environmental changes. The third is the short-term views of resource management and sustainability held by decision-makers in peripheral communities.

Given that most governments in the Pacific Islands region have failed for more than two decades to disseminate appropriate adaptive solutions using top-down approaches, it seems timely for assistance to be targeted directly at community level where the greatest disconnect lies between the science and stakeholder awareness of climate change.

Keywords

climate change, Pacific islands, environmental governance, adaptation, sustainability, peripheral areas

Introduction

Pacific Island Countries comprise comparatively small landmasses surrounded by a vast ocean. The islands range from high volcanic islands, such as most in the subregions of Melanesia and Polynesia, to low-lying atoll islands such as those in the countries of Kiribati, Marshall Islands, Tokelau and Tuvalu. Most Pacific islands are located in regions that experience tropical cyclones and (ENSO-linked) droughts; many are also vulnerable to earthquakes, tsunamis and volcanic activity.

Pacific islands began to be settled, following cross-ocean voyages of more than 1000 km, around 3500 years ago (Hung et al., 2011). Modern interactions between Pacific Island peoples and the environments from which they subsist are therefore based in many instances on a rich indigenous knowledge that has traditionally been able to cope with short-lived changes in ecosystem productivity (Aalbersberg et al., 2005; Johannes, 2002). Today most Pacific Island people continue to depend, more or less, on foods that they obtain from their surrounding environments, both terrestrial and (nearshore) marine, as well as deriving a range of (non-subsistence) goods and services from these.

The capacity of Pacific Island environments to sustain their human populations has been increasingly strained in many locations over the past hundred years as a result of changes in the nature and magnitude of demands being placed on them (FAO, 2008; Schandl et al., 2011; Thaman, 1982). This is true particularly of the increasing (coastal) population pressure and the growing imperative to produce food surpluses (Barnett, 2007; McGregor et al., 2009; Turner et al., 2007). This situation is likely to worsen over the next few decades as populations grow, some resource-producing systems are exhausted, and as Pacific Island environments change in response to a warmer world, a higher sea level, and experience more high-intensity tropical cyclones (Barnett, 2011; Barnett and Campbell, 2010; Mimura et al., 2007).

Managing future threats to livelihoods in the Pacific Islands region not only requires the identification of effective and sustainable adaptive solutions, but also effective and sustainable implementation of these. As with other developing countries, this is likely to be easier in geographical core areas because the need for adaptation will be driven by socio-economic imperatives, but beyond these cores there are likely to be greater challenges (Byg and Salick, 2009; Schwarz et al., 2011). In such peripheral areas, it is likely that most communities will need to develop and implement their own adaptive strategies, as most do today, not least because the present failures of central government – especially in archipelagic countries – to reach national peripheries (Connell, 2010; Hassall, 2008) are likely to be exacerbated in the future (Iati, 2008; Nunn, 2009a).

The present study is therefore concerned with understanding the nature of environmental decision-making in peripheral parts of Pacific Island countries, how and why in most cases this has largely failed to incorporate both national and global agendas, and what might be done in the future to optimise the efficacy of such decision-making. Despite millions of dollars of donor aid being provided for climate-change adaptation over the past 30 years in the Pacific Islands region, most communities therein are no better prepared to adapt to future climate change than they were before (Ilati, 2008; McGregor et al., 2009; Nunn, 2009a). The challenges from future climate change are becoming daily more pressing so there is a growing need to empower community leaders to make appropriate decisions about the environments they control in order to ensure that they continue – as far as possible – to sustain local people in the future. In the absence of such empowerment, it is likely that communities, especially most of those in peripheral areas, will respond iteratively and inappropriately to climate change and that long-term adaptation will therefore be more costly and cause greater disruption to livelihoods in such areas than is necessary (Nunn, 2010; Tisdell, 2008).

Challenges of climate change for Pacific Island Countries

Climate change poses a myriad of challenges to Pacific Island Countries that threaten livelihoods, settlements, and development aspirations (Barnett and Campbell, 2010; Nunn, 2009a). While serious impacts are unavoidable, the degree to which they affect these countries depends on their degree of preparedness. With effective and anticipatory environmental management, many problems could be averted, particularly those around human subsistence and the abrupt involuntary abandonment of island coasts, and some countries may even be able to continue along their declared development trajectories (PIFS, 2007). Without such interventions, it is likely that 10-20 years from now, Pacific Island Countries will start experiencing fundamental challenges to the sustainability of many of the interactions between their populations and the environments they occupy. These will range from the inundation and salinization of usable coastal lands to losses of nearshore marine ecosystem productivity that are currently key to human subsistence throughout most of the region (Barnett and Campbell, 2010; McGregor et al., 2009).

Over the past 30 years, Pacific Island Countries have ratified most international treaties and protocols regarding environmental sustainability and climate change yet there remains a gulf between declaration and implementation (Alley, 1999; Barnett and Campbell, 2010). Much external funding intended to underwrite the costs of climate-change adaptation has been given to Pacific Island governments on the assumption that the top-down approaches they have adopted would be effective in embedding and

mainstreaming climate-change adaptation at the local level. This assumption was wrong for it has become apparent, as in many developing countries, that top-down environmental legislation cannot be effectively disseminated or enforced (Lane and McDonald, 2005; Mataki et al., 2007). This approach has failed to elicit the appropriate effective and sustainable adaptive responses that are needed (Lata and Nunn, 2011; Nunn, 2010).

To provide some specific data to test these conclusions and determine the degree to which they apply throughout the peripheral parts of Pacific Island Countries, a project was conducted with the following aims:

- a) To isolate the dominant environmental decision-making processes in peripheral (non-urban) parts of Pacific Island Countries,
- b) To ascertain the degree to which both science and national policy influence environmental decision-making in such places,
- c) To identify the key barriers to effective environmental decision-making for adaptation to climate change in peripheral parts of Pacific Island Countries.

Case studies from Pacific Island Countries

In order to sample the nature of environmental decision-making processes in peripheral parts of Pacific Island Countries, this study focused on four countries: Cook Islands, Fiji, Kiribati, and Vanuatu (Figure 1, Table 1). These countries were selected because collectively they represent the natural and developmental conditions of island nations in the Pacific. While islands in the Cook Islands and Kiribati are comparatively small, remote and dispersed, those in Fiji and Vanuatu are on average larger and concentrated in denser archipelagos. These islands are also mostly high volcanic islands whereas those in the northern Cook Islands and Kiribati are almost exclusively low (atoll) islands of a kind that are more vulnerable to climate change than others (Barnett and Adger, 2003).

[insert Figure 1 and Table 1]

These countries were also chosen because they exhibit to differing degrees the role of tradition in environmental decision-making (Roberts et al., 2007). Owing to their close connection to (metropolitan) New Zealand, such decision-making in the Cook Islands is that mostly underpinned by global agendas. In Fiji, environmental decision-making is also informed to some extent by these, although there are significant core-periphery gradients of awareness. Steeper core-periphery gradients exist in Kiribati and Vanuatu, where almost all decisions about the environments made outside the cores are contextualized within traditional decision-making frameworks and are uninformed by

global agendas. The four countries selected face similar environmental challenges linked to climate change, both that arising from slow iterative changes (like temperature and sea-level rise) and those associated with climate extremes, like tropical cyclones and droughts.

Many Pacific islands are effectively entirely coastal, especially the long sinuous atoll islands of Kiribati, which heightens their exposure to climate-driven ocean stressors. Yet on many larger higher islands, the overwhelming concentration of people and revenue-generating activities along island coasts means that they too are often overwhelmingly coastal. The inland parts of such islands are typically sparsely populated, often by groups whose livelihoods also depend on activities in the coastal zones. This underscores the overwhelming importance of sea-level rise (and other ocean stressors) for Pacific Island Countries and their potential for major socio-economic impacts, some of which have become apparent in embryonic form over the past decade or so.

Coastal inundation is increasing throughout the Pacific Islands, most visibly at high tide during extreme precipitation events and storms. Flooding during these foreshadows what is likely to become increasingly widespread in the future (Barnett, 2011; Chowdhury et al., 2010). In terms of socio-economic impacts, the effects of inundation are clearly problematic for coastal settlements and infrastructure but arguably more so for agriculture and groundwater resources which take longer to recover. In addition, while settlements and infrastructure can be re-located, agriculture on most islands is concentrated on the fertile soils of the flat coastal plains and riverine lowlands, which are becoming increasingly flood-prone, and cannot be re-located (Nunn, 2009a; Tisdell, 2008).

Shoreline erosion is prevalent along almost all soft-sediment coasts in the Pacific Islands, an observation that is most readily interpreted as a result of recent sea-level rise, amplified locally by storm surges and uninformed human impacts (Nunn, 2000; Solomon and Forbes, 1999). Research showing that some atoll-island shorelines experience both progradation and erosion (Webb and Kench, 2010) does not negate the region-wide prevalence of shoreline erosion.

Methods

Data about environmental decision-making were gathered from selected peripheral parts of the four island countries selected. In all countries, at least two islands were selected, one within the near-periphery, the other within the far-periphery (Figure 2). The periphery is defined both in terms of space and the prevalence of traditional livelihoods. Thus in the Cook Islands, Aitutaki is considered near-peripheral because of

the degree to which tourism activities have become established while Mauke is considered far-peripheral because it is almost untouched by globalized commercial enterprises of this kind. In Fiji, Beqa and Naviti islands are considered near-peripheral because of the embryonic penetration of tourism while Vanua Levu, at least the southwest parts that were sampled, is regarded as far-peripheral because of the absence of significant commercial engagement in the national economy. In Kiribati, Butaritari is considered near-peripheral because of its proximity to the core as well as the national importance of its agricultural productivity; Beru is considered far-peripheral because of distance from the core and its comparative lack of participation in the national economy. In Vanuatu, the north coast of Efate Island is considered near-peripheral because, by virtue of being on the same island as the national core, is able to marginally engage in commercial activities, something that is absent on Pentecost.

[insert Figure 2]

Within the islands/areas identified in each island country as near- and far-peripheral, representative coastal settlements were targeted and university-student research assistants from these (or nearby) communities engaged to carry out the field research, particularly the interviews. Two key criteria of research-assistant selection were (1) proficiency in the preferred vernacular of the people living in the communities targeted and (2) familiarity with the cultural contexts suited for data collection. In rural parts of Pacific Islands, community engagement for the purpose of data collection is generally effective only if it takes place within such contexts, both in larger-group situations where community leaders are approached appropriately to permit data collection to proceed, and, once that permission is received, in individual (or smaller-group) situations. The former situations are often ritualized, often requiring all heads of household to be present, sometimes requiring traditional gifts (like *kava* roots) to be rendered to a group's titular head.

Gender plays an important role in the types of approaches and the access to interviewees of the other gender. The gender of the interviewer usually determined whether or not questions might be put to groups of females; in most Pacific Island societies, an adult female cannot be readily interviewed by a male, although a female may interview a male (see Figure 4D). Interviewer age was not a cultural concern.

In each of the settlements where data collection was to take place, the target was to interview between 5-10% of the adult (>18 years) resident population who had lived continuously in the settlement for a minimum of 20 years, the assumption being that persons who had resided there for less than 20 years (often women who had moved to their husband's settlement following marriage) would be less familiar with the local environment than longer-term residents. It was also intended that the gender balance within the sample would match that within the total pool of potential interviewees, which

in all cases comprised more males than females. The age balance of the sample was also matched to that of the pool of potential interviewees in each community, the divider (between young adult and old adult) being placed at 40 years. Finally, giving the social hierarchies that pervade most traditional Pacific Island societies, interviewees were tasked with interviewing the principal leader in each settlement and then sample a number of subordinate decision-makers, if present, in proportion to the entire pool of potential interviewees.

The results are shown in Table 2. A total of 191 individuals from 18 peripheral settlements in the four sample countries were interviewed. The majority (72%) were male, reflecting the residence bias (see above) introduced deliberately. There is quite an even split between interviewees 18-40 years (53.5%) and those >40 years (46.5%) but this disguises some interesting differences between countries. Remembering that for each settlement the ages of persons sampled are proportional to the entire community, it can be seen that in the more affluent countries (like the Cook Islands), a greater proportion of people >40 years old live in these communities while the converse is true of poorer countries (like Kiribati and Vanuatu). Traditional leaders (17% of total number of interviewees) were found in all settlements, the variations shown in Table 2 thought to reflect more the variability between individual settlements rather than macro-scale environmental governance.

[insert Table 2]

Protocol requires that the traditional (principal) leader of each settlement was approached first to obtain permission for the study to proceed. In almost every case, upon approaching the settlement for the first time, the student interviewer sought out a gatekeeper (usually identified earlier through personal networks) who would escort the interviewer to the leader and help explain the purpose of the study, and oversee the process of requesting permission for the study to proceed. It was at this stage that the nature and purpose of the study was explained. Once permission was obtained, this was often followed by an interview with this leader during which information was collected about the age and gender profile of the community. The latter information informed identification of the target sample, usually carried out in collaboration between the interviewer and the gatekeeper.

While the interview with the leader may have been (unavoidably) a group meeting, a meeting of the entire community was also called by the leader in many of the settlements at which there was a more general discussion. While interviewers allowed this to contextualize much of the data collected during interviews with individuals, these occasions were not treated as interviews owing to the diversity of views aired. Once the sample had been identified, a schedule was drawn up to meet with the individuals concerned to conduct interviews. In most Pacific Island cultures, it is quite alien for

someone from outside a community to be allowed to conduct a prolonged interview alone with someone from the community, so in most such interview situations the gatekeeper was present as well as 2-3 other peoples, often from the interviewee's close family.

Each interview required 29 questions to be answered. The first group (1-7) asked about the kinds of environmental problems experienced by the community, their impacts on various sectors (subsistence, water supply, fisheries, housing, health), and whether or not the frequency and magnitude of these problems have been changing recently. The remaining questions (8-29) asked about the nature of environmental decision-making in the community, how problems are brought to the community's attention, how they are discussed and by whom, and how solutions are identified and implemented. Some questions also sought to understand community awareness of national and regional/international environmental agendas. Examples of past environmental problems and the way in which they were addressed were sought from interviewees. Data obtained are available in the full report of this study (Nunn, 2008).

Cook Islands

The northern Cook Islands are comprised exclusively of atoll islands while the larger islands of the southern group are higher and more populous. Two non-atoll islands were selected as case studies: Aitutaki and Mauke, both of which are located peripherally in the southern group (Figure 2A). The economy of both islands is supported largely by tourism although subsistence agriculture and fisheries are also significant. An important finding is that because of the comparatively high GDP and the close links with metropolitan New Zealand, many Cook Islanders do not need to follow a subsistence lifestyle – they have cash to purchase food – so they are less concerned about the health and sustainability of ecosystems on which people in other case-study countries are critically dependent (Marsters et al., 2006).

Amongst Pacific Island nations, the Cook Islands has a high reputation for effective and leading engagement with the evolving international climate change agenda and has had – for more than a decade – a Climate Change Division operating within the National Environment Service that runs a number of projects throughout the country in association with other government departments and non-government organizations (NGOs).

The close ties that the Cook Islands has with New Zealand explains its healthier economic condition, generally higher environmental awareness, as well as the close nature of its engagement with global sustainability initiatives. The latter is well illustrated by the success of top-down environmental decision-making in the Cook

Islands – something which renders it exceptional among Pacific Island nations. In the Cook Islands, there is effective two-way communication between community spokespeople and government leaders concerning a range of environmental concerns, not simply those relating to climate change. This is something that is comparatively easy to achieve in a nation where there are fewer than 20,000 residents than in larger countries like the other three selected (see Table 1).

This does not mean that environmental decision-making at local levels in the Cook Islands follows a wholly non-traditional model. At the study sites on both Aitutaki and Mauke islands, environmental problems which cannot be solved at community level are referred to Island Councils, which include government officials, elected representatives and unelected traditional leaders. As elsewhere in the selected countries, there is no evidence that traditional leaders are especially well-informed about climate change but this is a non-issue here because these people have no more power than any other member of the Island Council. Owing to the presence of government officials on these Councils, they are aware of national legislation pertaining to the environment and sometimes receive briefings from the National Environmental Council which helps government develop environmental policy. The key difference between the Cook Islands and the other three countries studied is that there is no requirement for traditional leaders to play any role in environmental decision-making at any level of society.

Yet there is a degree of mismatch between national policy and grassroots decision-making which, while far less than in other case-study countries, is nonetheless significant and symptomatic of the more prevalent situation in Pacific Island Countries. At the heart of the mismatch lie the greatly differing priorities at national level – informed to a large extent by international climate change agendas – and at community level where there is more emphasis on the attainment of short-term goals. For example, the people of Mauke are concerned with the lack of building standards for septic tanks since sewage contaminates underground water sources. On Aitutaki, people are more worried about rotting pipes causing saltwater pollution of tap water than they are about climate change. Both issues, of course, would need to be dealt with in any adaptation project that looked at a sustained water supply for the future.

People on both islands are comparatively well informed about climate change but perceive it as alien and removed from their everyday lives, something that the government will resolve on their behalf without their input rather than something that might already be affecting them and their livelihoods. People are also keener to engage with government about more immediate environmental problems and less so about those linked to climate such as tropical cyclones, drought and coastal erosion. Rather than climate change, these phenomena are viewed as manifestations of climate variability to which there is an inbuilt cultural tolerance. Most communities on Aitutaki

and Mauke adhere to the rubric of environmental sustainability, especially around waste disposal, water conservation, sustainable agriculture and fisheries, forestry and the maintenance of coastal vegetation (see Figure 4A).

The close association with New Zealand as well as the comparatively small population of the Cook Islands explain the relative efficacy of community-level environmental decision-making compared to most other Pacific Island nations. In specific terms, this means that funds for policy development provided by external donors ensure that the legislative framework for top-down management of climate change issues is embedded as effectively in the Cook Islands as it is in its metropolitan neighbours. Several examples of this effectiveness were encountered. On both Aitutaki and Mauke, the Climate Change Division has fostered climate change awareness through seminars and informal community gatherings. The National Environment Service regularly organizes workshops to raise public awareness of environmental issues.

Despite the generally satisfactory state of rural environmental decision-making in the Cook Islands, some barriers to its effectiveness were nevertheless identified. One barrier is the dependence of communities on central government for guidance about even the most mundane environmental issues, especially if these are novel. A second barrier is that procedures for routine reporting of grassroots environmental concerns via Island Councils to national level (bottom-up) were perceived by some informants as unduly cumbersome, which may discourage such reporting. The final barrier is the preoccupation of communities with short-term environmental change and the perception that global climate change is an alien issue, at best one that should concern only government.

Fiji Islands

The Fiji Islands is a comparatively large island group where there is a steeper development gradient between cores and peripheries than in the Cook Islands (Figure 2B). Larger Fiji islands are often mountainous yet most people live along their coasts and are engaged in subsistence agriculture and fishing, often in rural areas only partly within the cash economy, which dominates activities in the main urban centres and those areas where tourism activity is concentrated. Elsewhere revenue is generated by mining, commercial agriculture, and manufacturing.

Fiji has been independent since 1970 and, while national decision-making for climate change has generally followed international norms, the success of the attendant top-down approach has been piecemeal at best with most rural communities forced to address associated environmental problems without any external guidance. This is partly a function of the size of both the population and the area over which they are

distributed. It is also a function of the lower GDP in Fiji, compared to the Cook Islands and the logistical difficulties of accessing outlying parts of the archipelago.

The Government of Fiji has long been engaged with the international climate change agenda and established a Department of Environment twenty years ago, which periodically employs a Climate Change Officer. In what might be interpreted as a pragmatic response to discernible issues, the Department focuses more on conservation and preservation – the thrust of the 2005 Environment Management Act – rather than anticipatory adaptation to climate change. This is done in the name of sustainability but the underlying assumption appears to be that, once current unsustainable practices (arising from economic development) cease, human-environment interactions will thereafter become sustainable. There is little crossover between the environmental sustainability agenda and the (subordinate) national climate-change agenda.

Fiji represents a situation where top-down approaches to environmental management and bottom-up calls for environmental solutions have both penetrated some way into the fabric of decision-making but generally remain far apart. The two approaches might also be characterized as modern and traditional although, as elsewhere, the distinction is often blurred (Lane and McDonald, 2005). Like most independent Pacific Island Countries, Fiji has received large amounts of external aid for nearly three decades for the purpose of developing solutions for adaptation to climate change. This aid has contributed to a considerable body of relevant policy and legislation but this is largely moribund as there is no effective means for its countrywide enforcement.

In most peripheral parts of Fiji, there is a long-established and culturally-ingrained system of environmental (and other) decision-making that has its roots in pre-colonial governance systems but which was strengthened in many of its current aspects during the colonial period (France, 1969). This system of governance is dominant on all three case-study islands in Fiji – Beqa in the south, Naviti in the west, and Vanua Levu (the second largest) in the north (Figure 2B).

Hereditary chiefs and heads of clans (*mataqali, yavusa*), usually all male and over 50 years of age, commonly decide on matters pertaining to village (community) affairs, especially resource-associated issues which include environmental problems and developments. In some villages, there are fora for lower-level decision-making where such issues can be debated. If these issues cannot be resolved within such fora, they are referred to hereditary leaders – sometimes just the village or district chief – who make decisions that are commonly irrevocable, often enduring.

In all Fiji villages, the headman (*turaga-ni-koro*) is an elected official who is responsible for facilitating discussions of environmental (and other) issues. He is also the conduit

for passing government directives, typically communicated at district meetings, on to the other inhabitants of the village. This is a role that sometimes works well yet, because government agendas to do with climate change often appear too obscure and phrased in such alien terms, it generally fails for environmental imperatives. That said, Fiji is in the process of developing an *iTaukei* (Fijian-language) climate-change glossary that is intended to rectify this problem.

In all villages studied, there is at least one lower-level committee that meets regularly to discuss village development (*komiti ni veivakatorocaketaki*). This committee is convened by the headman and discusses matters such as housing, water supply, electrification, communal food production, and communications (roads, public transport). These committees have a generally short-term perspective and do not consider they have a mandate to discuss long-term stressors on the resource base like climate change. They do sometimes discuss the effects of (assumed) climate variability, particularly around the need for remedial measures for shoreline erosion and coastal flooding, or assistance strategies following natural disasters. In some cases, government officials have engaged rural people directly on environmental issues. For example, on Beqa and Naviti islands, workshops have been held to raise awareness about tropical-cyclone preparedness.

No-one interviewed in any village – this in 2008 and 2009 – was aware of climate change nor did anyone express any knowledge of related government policy or legislation. A low (5%) number of respondents recognized that climate variability (particularly droughts and interannual sea-level changes) might affect resources, particularly marine resources. Most others interviewed ascribed changes in these to human impacts, especially the clearance of mangrove forest from island coasts, nearshore water pollution (particularly from nearby pit toilets), and leaking boat engines.

While many respondents admitted that climate was not always predictable from one year to the next, this was attributed to natural (short-term) climate variability rather than any more fundamental (long-term) climate change, a conclusion echoing that from the Rewa Delta on southeast Viti Levu Island in Fiji (Lata and Nunn, 2011). This interpretation influenced several decisions including the belief that the widespread shoreline erosion being experienced along Fiji's coasts is a temporary aberration requiring no fundamental response, such as the re-location of vulnerable settlements.

Almost all people in the villages studied declared themselves religious, their lives guided by Christian values that are frequently articulated in fundamental terms. This encourages the adoption of a short-term outlook for any issues that elsewhere might be regarded as requiring a longer-term strategy. In relation to climate change, the view was often expressed during interviews that God would not permit any deleterious impacts on those who adhered to Christian tenets, a view encountered elsewhere in the

Pacific Islands (Donner, 2007; Lata and Nunn, 2011; Mortreux and Barnett, 2009; Nunn, 2009a).

All this helps to explain why in the Fiji villages studied, decisions about changing environments are generally short-term, made mostly by hereditary leaders who generally lack much formal education, are based on remembered experience and/or inferred best practice and/or the uncritical replication of solutions from nearby settlements.

Three principal barriers to effective environmental decision-making in rural Fiji are recognized. The first is the lack of awareness and education (of climate change) among key decision-makers. The second is the traditional decision-making structures, largely impervious to external advice, which operate in most rural communities. The final barrier is that the religious beliefs of many people in such villages inhibits long-term anticipatory responses to climate change.

Kiribati

Most islands in Kiribati are atolls which rise less than 3 m above mean sea level and are composed of largely unconsolidated sediments, making them more vulnerable than other types of islands to erosion. Kiribati has a high ocean-land ratio and its economy is heavily reliant on funds remitted from its people living overseas as well as from licensing of foreign fishing vessels (Borovnik, 2006; Thomas, 2002). Most people in Kiribati subsist at least in part from food that is grown or collected locally by their family units; there is a high dependence on fresh marine foods, particularly in the outer islands (beyond Tarawa, Figure 2C). Communities in peripheral locations were studied on the islands of Beru in the south of the western (Gilbert) group and Butaritari in its north. The latter island receives more rainfall than the former and is therefore able to support a more diverse and intensive agriculture. Owing to out-migration of residents from islands like Beru and Butaritari to urbanized South Tarawa, subsistence pressures on their terrestrial environments has decreased slightly over the past few decades.

Kiribati has become an iconic location in the contemporary global climate-change discourse owing to the undeniable vulnerability of its islands to sea-level rise which may even result in the disappearance of some smaller ones in the next thirty years (Dickinson, 2009; Nunn, 2009b; Woodroffe, 2008). Through its Ministry of Environment, the Government of Kiribati has been at the forefront of discussions in global fora to develop strategies for national climate change adaptation. The flagship initiative is the Kiribati Adaptation Project (KAP), funded by the World Bank, which is tasked with awareness-raising, protecting and managing freshwater resources, and restricting

inundation. The first stage of this focused on Tarawa, the most densely-populated atoll, the second stage is trying to extend it to outer islands.

At one level, environmental decision-making in peripheral Kiribati has similarities with Fiji for there is a conspicuous disconnect between national (top-down) and community (bottom-up) approaches but it is also quite unique. The Ministry of Internal and Social Affairs (MISA) is the government agency responsible for addressing resource issues beyond the Tarawa core. It is largely reactive, often only to a ponderous process of bottom-upward reporting of environmental problems. In the view of many community leaders, recourse to MISA is a last resort, typically when the sole perceived solution to a particular problem lies beyond the means of communities in both financial terms and implementation.

Most communities on Beru and Butaritari with which discussions were held explained that they preferred to try and solve their own environmental problems. While the traditional decision-making process was intact for this purpose on Beru, it had been modified on (less-peripheral) Butaritari as a result of its demonstrated inability to provide sustained solutions to the kinds of environmental problems that have appeared over the last twenty years on the island. The threats to the environments of Beru and Butaritari from climate change are largely to do with preventing shoreline erosion and wave (saltwater) overwash, both of which threaten terrestrial productive capacity and infrastructure (see Figure 4B). Subsidiary concerns relate to drought, groundwater pollution, storm-surge impact, and marine-resources depletion.

In each village on Beru, the highest-level decision-maker is an unelected male elder known as *unimwane*. His role is to ensure smooth functioning of the daily affairs of the community which are regulated at a higher level through the Island Council. The decision-making powers of this Council are subordinated to that of the chief *unimwane*. Matters that are beyond the means of the community to address are referred – with endorsement from this *unimwane* – by the Island Council to MISA. The decision-making processes that operate on Beru are said to be similar to those throughout Kiribati in earlier times when an *unimwane* represented the apex of decision-making on each island.

Today on Butaritari Atoll, this system has been modified and there are even differences between villages on this comparatively large island. At one level these modifications can be seen as a result of Butaritari being closer to the developmental core of Kiribati but they are also considered to be an outcome of the comparative seriousness of the threats posed by global environmental change to livelihoods on this uncommonly agriculturally-productive island. In Ukiangang Village, the village committee not the *unimwane* makes decisions about what matters are referred to the Butaritari Island Council although his advice is sometimes sought. In Tabonuea Village, the *unimwane*

is never consulted in the decision-making process; decisions are made as a result of voting by all adult male residents and, if necessary, passed onto the Butaritari Island Council where *unimwane* are present, but only in an advisory capacity. With specific reference to climate change issues, this situation is being reinforced by the awareness that key people living on Butaritari, usually younger and more formally-educated than *unimwane*, have about climate change.

The Government of Kiribati has been receiving external funding for adaptation to climate change for more than 25 years, most recently through the KAP and the US\$10 billion Adaptation Fund, agreed at the Copenhagen Climate Summit in 2009. While most of the government's top-down initiatives have been reactive to global agendas, the principal purpose of the KAP is to position Kiribati to be able to proactively respond to climate change through anticipatory adaptation. That the KAP has not yet succeeded in this is in part due to the myriad other threats to sustainability that Kiribati faces (Storey and Hunter, 2010) but also the low number of appropriately-qualified professionals in government, the practical difficulties of reaching outer-island communities, and the widespread perception at least among rural dwellers that the government lacks the will to address these issues equitably throughout the nation.

Two barriers to effective decision-making for climate change can be identified in Kiribati. The first is lack of awareness and education about climate change, something that is – as in other Pacific Island Countries – producing inadequate responses. This is particularly true of the nature of most environmental decision-making on more traditional outer islands like Beru where the *unimwane* has essentially unfettered decision-making power, a situation analogous to that with traditional chiefs in rural Fiji. Interviews with *unimwane* and their traditional (elderly male) advisers showed that their environmental decision-making was uninformed by either national policy and legislation or by scientific understanding. The second is that channels for communicating environmental concerns upwards to the only agency (MISA) mandated to deal with them are unduly cumbersome and time-consuming, a similar complaint to that in the Cook Islands. Like that country, this leads in Kiribati to many such problems not being reported which inhibits the implementation of appropriate adaptive responses to climate change. As environmental concerns might be expected to increase in both number and complexity over the next few decades, these kinds of institutional problems will only frustrate effective and sustainable adaptation if they are not resolved.

Vanuatu

Most islands of Vanuatu are comparatively large and high, and of volcanic origin. Compared to other Pacific Island Countries, Vanuatu is uncommonly prone to a range

of natural hazards – volcanic eruptions, earthquakes and tsunamis, tropical cyclones – a situation that has given rise to a deeply-embedded cultural view that extreme events are part of everyday life (Galipaud, 2002). The coasts of most islands in Vanuatu are more densely populated than their interior parts although these, as in neighbouring Solomon Islands, do have higher densities of people than most such islands in the Pacific.

While there is overarching direction on climate change activities in Vanuatu provided by a National Advisory Committee, most practical work is carried out through the Vanuatu National Meteorological Service (VNMS) which has a suite of other responsibilities associated with weather forecasting in both the short and medium term. This situation parallels that in many other Pacific Island Countries and explains the focus in these on medium-term climate variability rather than longer-term climate change.

Owing to the comparatively large size and low GDP of Vanuatu, there is a steeper developmental gradient between core and periphery than in any other case-study country. Beyond the capital (Port Vila) and especially beyond Efate Island, where it is located, there is little awareness about climate change. Most people in Vanuatu subsist off terrestrial and nearshore-marine foods, and there is little foreign exchange earned outside Efate Island. Communities studied were on the periphery (north coast) of Efate Island and on Pentecost Island (Figure 2D).

In Emua Village on Efate, environmental decision-making is controlled by village bylaws. Environmental problems are brought to the attention of the appropriate committee (Figure 3) which decides democratically what should be done. If the decision is to seek higher-level action, it is passed up through a traditional hierarchy to the Emua Village Council where unelected elders and the paramount chief will decide what to do next. When the problem is considered to be beyond the resources of the village to resolve, it is generally referred to the North Efate Area Council and thence to the Shefa Provincial Council. While the latter body includes unelected advisers, it also comprises government-appointed persons who can recommend the allocation of funds from both government and donor sources. Most people in Emua regard this hierarchical decision-making process as unduly cumbersome and prefer to have decisions made and implemented within the village, although sometimes this is not possible. One example is the effects of logging in the Emua catchments by commercial companies over the activities of which the people of Emua have no control, even though these activities impinge on their livelihoods: a complaint similar to that of rural communities in the adjoining Solomon Islands (Hviding and Bayliss-Smith, 2000) and other developing countries (Robinson et al., 2010).

[insert Figure 4]

On Pentecost Island, decisions pertaining to village matters are made by traditional chiefs. Environmental problems are not recognized at the village level (Figure 4C); they are seldom discussed at village meetings because they are perceived as beyond the collective remit. Environmental issues are dealt with by individuals who vary considerably in their understanding of the causes of these. Concerns like tropical-cyclone impact and shoreline erosion are regarded as being the business of the government, particularly the National Disaster Management Office which coordinates and dispenses assistance after such disasters. Informants on Pentecost Island regard their attitude towards environmental issues as common throughout rural Vanuatu which, if correct, perhaps speaks to the cultural assimilation of frequent climate extremes and natural disasters in this uncommonly exposed island group (Galipaud, 2002; UNISDR, 2009).

[insert Figure 4]

In all rural communities studied in Vanuatu, there was no discernible awareness of climate change or what it might mean for the future. For example, at Emua, an observed increase in the incidence of coastal flooding (probably from sea-level rise) is considered normal since flooding has always been a part of life there. On Pentecost Island, people have recently observed differences in extreme sea levels and in the rate of shoreline erosion but regard these observations as unexceptional. In none of the rural communities studied had there been any awareness-raising about climate change from either government or NGOs (see Figure 4D).

Of the four countries studied, the disconnect between national policy and grassroots environmental decision-making is greatest in Vanuatu. People are making decisions about changing environments without knowing the background causes of the change or the most appropriate adaptive responses. Part of the reason for this is that most rural communities in Vanuatu seem loathe to seek assistance with what appear such comparatively trivial problems (like shoreline erosion compared to tsunamis, for example), an attitude strengthened by the cumbersome nature of the process and the often unsatisfactory responses.

Rural communities are encouraged, albeit not explicitly, to be reactive not proactive. This comes about as a result of government assistance to rural communities in need being received only after a disaster has occurred; several informants remarked that they never otherwise see government employees and politicians. It seems clear that national environmental policies have no effect on environmental decision-making in rural Vanuatu.

Two barriers to effective environmental decision-making are identified for Vanuatu. The first is the ubiquitous lack of awareness in peripheral communities about climate

change, the identification of its effects, and how best to adapt to these. Secondly, the role of tradition in environmental decision-making is a barrier. In Emua, while not entirely traditional, the blend of modern with traditional elements makes for a complex and cumbersome system. On Pentecost, the traditional system ignores environmental issues in a way that cannot be sustained for long, given the likely increase of their impacts in the next few decades, but also presents an opportunity for strategic intervention.

Discussion

Several barriers to effective governance for climate change have been identified in this study. Of these, some reflect issues, particularly institutional ones, that are internal to a particular country and can only be remedied within that country. Others cut across national borders and appear to be widespread in the Pacific Islands region and in developing countries elsewhere. These issues – lack of awareness, tradition, and short-termism – are discussed separately below.

Lack of awareness

It is deceptively easy for those unfamiliar with the Pacific Islands region to blame a lack of awareness and education among key decision-makers for their failure to engage meaningfully with climate change agendas but it is rarely so straightforward. Like other people who routinely subsist from the environment that surrounds them, most rural Pacific islanders are concerned principally with where the next meal for them and their dependents will come from rather than some seemingly nebulous imperative about climate change. To overcome lack of awareness about climate change in the Pacific Islands, it is simply not enough – as has often been glibly assumed – to inculcate their inhabitants with the same value system as that in developed countries where most meals come off supermarket shelves than somewhere beyond the end of the garden. Instead it is important to engage Pacific Island people – and those in developing countries elsewhere – by appealing to their desire for sustainably-bioproductive systems and demonstrating how these can be achieved, and tying this to what they value in their traditional systems (van Aalst et al., 2008).

Yet knowledge about the science of climate change cannot be avoided altogether. Key decision-makers have a right to learn what is happening beyond their island shores and how inevitably this will affect them. But it is hugely important that this information is delivered in an inclusive participatory manner, through the filters of preferred vernaculars and familiar conceptualizations, and in ways that are culturally acceptable.

Lack of appreciation of the importance of the medium over the last thirty years in the Pacific Islands is largely responsible for the disappointing extent of the uptake of the message (Nunn, 2009a). Unless Pacific Island Countries and their inhabitants feel that they own climate change and that it is not an exclusively foreign preoccupation, then adaptive solutions will be neither effective nor sustained (Nunn, 2010). In addition, climate-change messages should be uncomplicated and draw on experiences of rural people.

Tradition

As elsewhere in the world, many traditions in the Pacific Islands have evolved over long periods of time in response to particular sets of evolving stimuli. For this reason, such traditions may be ill-suited to dealing with novel stimuli, be these associated with urbanization, changing food consumption, rapid sea-level rise or any other such globalizing influence.

In peripheral parts of most Pacific Island Countries, routine aspects of life continue much as they have for centuries, perhaps even millennia. The contemporary pace of change in many such places may be slow but is likely to accelerate markedly in the next few decades, as a result of both the spread of globalization and climate-driven impacts on key ecosystems. Evidence for such changes comes from comparing environmental awareness among the people of the Cook Islands with that of those living in the other island countries studied. Evidence of their acceleration comes from comparing less-peripheral with more-peripheral locations, as in Kiribati and Vanuatu.

Traditional community-level decision-making structures could not effectively be replaced in the Pacific Islands but they could be adapted by empowering traditional leaders to make informed long-term decisions about their environments (Hook, 2009; Nunn, 2009a). In addition to targeting leaders, it is important to surround them with persons-of-influence in communities who are also empowered to understand the nature and impacts of climate change. Another useful approach would be to decentralize governmental expertise in environmental management to provincial/island level where it can more directly benefit rural communities.

Short-termism

It is perhaps inevitable among people who are concerned principally with deriving a regular supply of food from familiar resource bases that they will not be readily engaged with long-term planning for environmental sustainability, even if this is expressed as

food security. This attitude is manifest in many aspects of life in the rural Pacific Islands, such as beach- and reef-rock mining for immediate needs (including seawall construction), the unchecked use of fertilisers and pesticides on crops grown in coastal lowlands, and the deliberate over-harvesting of wild-food resources for special occasions (FAO, 2008; Schandl et al., 2011).

Such an outlook contrasts with growing concerns in many developed countries around sustainable living, even though these concerns arose only comparatively recently from pragmatic needs around global food security. Yet this view will also eventually be taken up by the inhabitants of developing countries, such as those in the Pacific Islands, for the same pragmatic reasons. In the interim, there have been approaches towards developing a focus on long-term environmental sustainability in Pacific Island Countries that are meeting with some success and are worthy of emulation. These approaches are largely participatory, and range in focus from waste recycling (Terry and Khatri, 2009), fisheries (Aalbersberg et al., 2005) and marine resources more generally (Veitayaki et al., 2003). These approaches seek “win-win” solutions that meet short-term community needs while also addressing long-term sustainability.

Conclusions

Barriers have two sides to them. Western science and western-trained decision-makers see many of the issues identified in this study as barriers to effective climate-change adaptation but this worldview is not the only lens through which the challenges of global climate change can be viewed (Kelman, 2010; Mercer et al., 2007). For millennia, Pacific Island peoples have been adapting to climate-driven environmental changes that have affected their resource bases (Nunn, 2007) and there is much about their experiences that could be valuable to contemporary planners in the region (Morrison et al., 1994).

That said, at the heart of concerns about accelerating climate change in the Pacific Islands is the accelerating need for effective anticipatory adaptation to lessen the multifarious impacts on societies which have – like most others – rendered themselves increasingly vulnerable to such impacts over the past 200 years. The outlook is not especially bright.

Given that most governments in the Pacific Islands region have failed for more than two decades to disseminate appropriate adaptive solutions using top-down approaches (Connell, 2010; Nunn, 2009a), it seems timely for assistance to be targeted directly at the community level where the greatest disconnect lies between the science and stakeholder awareness of climate change (Iati, 2008; Nunn, 2010). Since research for this paper was completed, several donors have begun targeting their climate-change

support at this level. It remains to be seen if a mutual respect among implementers and communities can be developed and whether scientific best-practice can be successfully merged with traditional environmental governance (Mercer et al., 2007).

Acknowledgements

The study on which this work is based was funded by the Asia-Pacific Network for Global Change (APN) through CAPaBLE grant CBA2007-03NSY. Interview in the Cook Islands were carried out by Miimetua Manuela and Nimerota Jim Brown, in Fiji by Jokim Kitolelei and Duncan Williams, in Kiribati by Elaine Bwebwe and Tiene Tooki, and in Vanuatu by Christy Haruel and Ann Tosiro.

Captions for figures

- Figure 1. Map of the Pacific Islands region.
- Figure 2. Maps of key parts of the four Pacific Island Countries studied, showing study-site islands. Note that islands in Kiribati appear larger than they actually are because reef-enclosed lagoons are included in land areas. Black circles indicate the main development cores, qualitatively judged as being the areas of the largest urban centres and their immediate surround, with a size roughly proportional to the perceived influence of these core areas.
- Figure 3. Structure of decision-making in Emua Village, Efate Island, Vanuatu, as explained by Chief Albert Malnaisinu and others to Christy Haruel in January 2008.
- Figure 4. Common issues concerning climate-change adaptation in Pacific Island Countries. All photos by or for Patrick Nunn.
- A. The community of Amuri (Aitutaki Island, Cook Islands) maintain a vegetation barrier between their village (set back on left) and the ocean (on right). Such practices arise from experience of flooding and shoreline erosion.
- B. Shoreline erosion combated by seawall near Tabonuea Village (Butaritari Atoll, Kiribati). Seawall construction was sponsored by government to protect the road that is a vital link on this island.

C. Informal sand mining near Lolbualabwa Village (Pentecost Island, Vanuatu) for cement manufacture exacerbates shoreline erosion.

D. Ann Tosiro discussing environmental issues with the people of Lolbualabwa Village (Pentecost Island, Vanuatu). She speaks their preferred vernacular and stands among the women, as is culturally appropriate.

Caption for table

Table 1. Key characteristics of the four countries studied. Data from www.spc.int and islands.unep.ch

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