

**Planning for Climate Change in the Pacific:
Valuing and Integrating Indigenous Knowledge**

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Introduction

Increasing global temperatures, rising sea levels, and changes in rainfall patterns and extreme weather events position communities in the Pacific Islands region at the epicentre of vulnerability (Keener et al 2012). As highlighted by Hay and Mimura (2013, p. 1), a diverse array of vulnerability assessments have been undertaken in communities across the region over the last two decades and all point to the regions high level of ‘risk to the adverse consequences of climate change’. Despite a flurry of community-based climate change adaptation activities being rolled out across the region, Pacific communities continue to face an ever-present level of vulnerability to the impacts of climate change (Hay and Mimura 2013). Planning for climate change therefore needs to continue across all levels of government in order to develop effective and sustainable climate change policies, and adaptation and mitigation activities.

The threats posed by climate change in the Pacific present complex governance challenges, which are only compounded by other competing issues such as economic development, poverty reduction and improvements to education and health services. However, it is crucial that governments continue to develop national climate change policies, support and fund on-ground adaptation efforts and advocate for global mitigation targets in international forums (Nakalevu 2006). As we argue throughout this chapter, well-formulated climate change policies and adaptation efforts could be more effective if they integrate Indigenous knowledge into their overall strategy for action.

Government policy stems from *outside* of the community, as does scientific knowledge (Mercer et al 2009). Much therefore can be learnt from Indigenous knowledge systems. We posit that climate change adaptation could be more effective if Indigenous knowledge and experiences were well understood and incorporated into climate change planning. In recent years, it has been acknowledged that Indigenous knowledge can enhance our understanding of climate change impacts and adaptation measures (Salick and Ross 2009; Nyong et al 2007; Riedlinger and Berkes 2001). This is reinforced by scholars, such as Finucane (2009, p. 1), who defend that ‘scientific knowledge is only one element of an effective risk-management process’ for addressing climate change. Indigenous knowledge is another core element for developing ways to address climate change.

This chapter outlines how and why Indigenous knowledge can be a vital component for climate change planning in the Pacific region. As explored in this chapter, it is hoped that a strong recognition of the role and value of Indigenous knowledge will be enshrined at the national policy level in Pacific island countries. At the local level, it is propositioned that Indigenous knowledge be safeguarded and integrated into climate change adaptation planning activities. Such initiatives, at both national and local levels, could empower communities most at risk to the impacts of climate change by acknowledging the valuable role they can play in being part of the solution. Indigenous knowledge is vitally important in reducing vulnerabilities to climate change for a whole host of reasons, as discussed in more detail below. Of paramount importance is that such ways of knowing are *internal* to the communities (as opposed to external scientific sets of knowledge), which has allowed communities to develop an intimate understanding of localised conditions, patterns and changes to their surrounding environment. Examples to showcase the role and value of Indigenous knowledge for climate change planning in the Pacific are also explored in this chapter.

Governance, Indigenous Knowledge and Climate Change: Understanding the Linkages

Governments play a critical role in controlling and managing the welfare of the country, and good governance is a critical ingredient for the development of sustainable and effective policies and programs. In planning for climate change, Meadcroft (2009) argues that governments should undertake the following measures: build strategic capacities for political leaders to actively engage in climate change issues; support the development of knowledge about climate change; monitor changes to climatic indices and local ecosystems; and implement climate change policies. According to Betsill and Bulkeley (2006, p. 143), governments can enhance their response to climate change by ‘fostering partnerships, encouraging public participation, lobbying national governments’, all of which can assist in alleviating the impacts of climate change. A missing ingredient in these measures is the role and value of integrating Indigenous knowledge into climate change planning activities at all levels of government, as detailed below.

Governments have played a vital role in the development of national climate change adaptation plans. However, as Agrawal (2008, p. 44) argues, there have been some limitations in the production of the National Adaptation Programmes of Action, stating that they failed to effectively incorporate ‘historical experiences’, vulnerabilities and adaptation knowledge and practices of local communities.

Given such circumstances 'local people may feel powerless and not responsible for combating climate changes, despite their own vivid experiences of climate change' (Salick and Byg 2007, p. 18). Building on this, Srinivasan (2004) found that policy makers in Bangladesh for example have rarely taken local knowledge into account, which has impeded the effective implementation of adaptation strategies. Similarly, Denton (2002) reveals that only modest efforts have been made to incorporate Indigenous and local knowledge into higher-level environmental policy outcomes in various locations. As these examples show, there is a greater need for the inclusion of local concerns and knowledge, cobbled together with scientific knowledge, when developing climate change initiatives. Moreover, integrating Indigenous knowledge into climate change adaptation planning can help address 'gender related inequalities' as it allows for opportunities to include valuable contributions from both women and men (Denton 2002, p. 10).

At the international level, the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Parry et al 2007) acknowledges that Indigenous knowledge and practices for coping with extreme weather events can effectively contribute to the development of culturally-appropriate strategies for preparedness and adaptation. Pleasingly, the Fifth Assessment Report (due to be released in stages from late 2013 to early 2014) aims to include case studies on how Indigenous knowledge can enhance our understanding of climate change impacts and effective adaptation strategies. During the Indigenous Peoples Global Summit on Climate Change (held in Anchorage Alaska in 2009), participants called for action by the Parties to the United Nations Framework Convention on Climate Change to recognise the importance of Indigenous knowledge and practices in developing strategies to address climate change (Indigenous Peoples Global Summit on Climate Change 2009). Recently, representatives from the Indigenous Rights Organisation shared their experiences of climate change at the international negotiations in Doha, Qatar in late 2012. Here, issues were discussed on the need to acknowledge Indigenous knowledge and for Indigenous people to effectively participate in the international climate change negotiations and related activities.

Across the globe, Indigenous people have built a unique set of environmental knowledge from adapting to environmental change and events, monitoring their surroundings and managing their natural capital (Weatherhead et al 2007; Turner and Clifton 2009). Through these close interactions with land and sea environments, Indigenous communities can provide records of seasonal observations and their coping mechanisms in response to environmental changes, which can

enhance adaptive capacity and resilience to climate change (Salick and Ross 2009). Brodnig (2000, p. 4) argues that local knowledge is not 'static' as the information is continuously 'renewed and revised' as it is passed on from one generation to the next. Each generation 'incorporates' its own set of local knowledge, observations and experiences into renewed knowledge systems (Nicols et al 2004, p. 69). Integrating local knowledge into climate change adaptation planning can promote community-based participatory approaches and the formulation of culturally relevant and sustainable adaptation strategies to enhance the resilience of vulnerable communities (McNamara and Westoby 2011). Such an approach would encourage communities themselves to develop and deliver solutions.

Local communities across the Pacific region are heavily dependent on their land and sea resources as a means of sustaining livelihoods. As such, local communities have learnt to conserve their resources and respond to various environmental stressors. Many communities have developed multiple mechanisms to adapt to local environmental conditions and extreme events and these practices have often been passed down through generations and modified to adapt to their current environmental conditions (Salick and Ross 2009). Indigenous communities in the Pacific (Lefale 2010; Bridges and McClatchey 2009) have drawn on their knowledge of the land and sea to: monitor changes (such as changes in wind patterns or seasons, flowering and fruiting patterns, and animal behaviour); manage natural resources; and plan daily activities. Bridges and McClatchey (2009, p. 140) made the case that: 'Over many generations these atoll cultures have survived major, unpredictable and locally devastating changes that are of the same magnitude as those expected from climate changes'. Deeply embedded in practice and belief systems (Berkes 2008), Indigenous knowledge in the Pacific is not only a crucial resource to assist our understandings of meteorology and climate, but also to map out appropriate and sustainable community-based strategies to adapt to the impacts of climate change. Both higher-level policy and community-based activities need to recognise and support the value that such alternative ways of knowing offer for climate change planning efforts.

Drawing from the Field: Fiji and Vanuatu

Fieldwork was undertaken throughout 2012 in six village communities – three in Fiji (Naselesele, Qeleni and Yanuca) and three in Vanuatu (Piliura, Tassiriki and Lonamilo). In-depth interviews (n=40) were undertaken with community members in each of the six villages to formally document the ways in which they have adapted to past changes – both slow-onset environmental change and

rapid-onset events. These findings illustrate how Indigenous knowledge can be utilised in national climate change policies, and importantly, facilitate community-based climate change adaptation initiatives.

These six communities have developed valuable knowledge about their environment, which they use to manage their natural resources, plan daily activities and respond to changing environmental conditions. This knowledge is gained from grandparents, parents and village leaders through story telling, direct instructions and demonstrations. This transfer of knowledge between generations indicates the evolving and changing nature of the knowledge; it is not static. Such an evolving knowledge system, according to Dixon (2005), indicates the strong ability of a community to respond and adapt to environmental changes in their surroundings.

The transmission of this knowledge, including traditional ways of living, farming techniques and village protocols, is considered vital. Based on the research conducted in Fiji and Vanuatu, the key ‘gatekeepers’ of this knowledge who pass it on to the younger generation included grandparents (36% of all respondents), parents (33%), village leaders (22%), other (5%) and neighbours (4%). At all six sites, village leaders play an important role in transmitting knowledge to the younger generation especially during afternoon yaqona sessions or at village gatherings. According to custom in Vanuatu, the boys accompany their fathers to the ‘nakamal’ (gathering place for men and boys) to learn local ways and knowledge from the village leaders and elders, while the girls learn from their grandmothers and mothers as they help with household chores. This knowledge is largely recorded as songs, dance and folklores, and is passed down orally between generations. In the majority of cases, there is no formal written documentation of this knowledge.

All six communities collectively hold vast knowledge about adapting to extreme weather events (including droughts, floods and cyclones), as well as other longer-term changes (such as sea level rise, inundation and coastal erosion). Over time, local communities have developed effective coping strategies to respond to extreme weather events and longer-term change, manage their resources and orient their activities in order to sustain their livelihoods. In response to coastal erosion, for instance, local communities in Fiji have constructed small-scale seawalls along some parts of the foreshore, planted native grasses and trees along the coastline and relocated houses (‘bures’) further inland. Similarly in Vanuatu, communities living by the coast have relocated their houses further inland and

built stone seawalls (using cement, dead coral and rocks) as a strategy to minimise further coastal erosion. Community members have also planted a series of grasses and trees, such as *Chrysopogon Zizanioides* (vetiver grass) and *Barringtonia Asiatica* (fish poison tree), along the coastline to minimise the effects of erosion.

Community members have adopted various strategies to cope with cyclones, the annual season for which is from November to April in both Fiji and Vanuatu. In response to cyclones, locals have built houses (called 'hurricane houses') using local materials, planted particular trees around the village to act as wind breaks, and used local materials (such as bamboo and banana leaves) to secure thatched houses and iron roofs. To reduce damage to plantation crops and food security, the men prune the crops (such as cassava and yaqona) prior to the cyclone to reduce the surface area of the leaves exposed to strong winds. Any matured crops or fruits from trees are also collected and cooked in a 'lovo' (an underground oven pit), allowing such items to be preserved for over a week. Other food preservation techniques have been used. For instance, cassava is grated, mixed with coconut cream and then cooked on stones to dry, which preserves it for over a week. Following extreme weather events such as cyclones, local communities usually grow crops that mature quickly (such as kumala, corn and certain varieties of cassava) that can help address food shortages.

To secure food resources in times of drought, locals have learnt to diversify their produce and cultivate crops that are able to withstand dry weather conditions. Before the annual dry season, farmers in Fiji plant crops such as kumala (sweet potato), tivoli (wild yam), kawaai (yam), uvi (yam), giant swamp taro and wild cassava. Following decades of trial and error, these crops can survive seasons with low rainfall and provide a secure source of food. In Vanuatu, drought-resistant crops such as tavioka (cassava), tivoli and certain varieties of bananas are grown. In addition, farmers grow various wild yams (such as saaina and suwip) that survive dry conditions. To prevent vegetables from dying, the locals of Lonamilo village in Vanuatu use plants such as *Narara Erythrina* and *Gliricidia Sepium* to shade low-lying plants, particularly green leafy vegetables. Flooding events can also cause serious damage, particularly to water pipelines, food supplies, houses and property. During these periods, local communities rely on wild crops (such as tivoli) from the bush and fish from the ocean. Relocating houses and gardens away from flood prone areas and building houses on stilts has also been practiced in response to flooding, inundation and salt spray during storm surges.

Concluding remarks

As pointed out by Macchi (2008, p. 7): 'It is widely accepted that poor, natural-resource dependent communities in the developing world are especially vulnerable to climate change, especially those living in high-risk areas such as small islands or low lying coastal areas.... These peoples may therefore have to offer valuable knowledge to learn from for future adaptation to and mitigation of climate change'. This chapter sought to raise two things. The first was the need for national climate change policies to recognise the role and value of Indigenous knowledge in climate change planning. It also sought to showcase how such knowledge could be used to develop community-based climate change adaptation activities, and in turn be considered as an important knowledge system alongside other scientific sets of knowledge.

Valuable local practices and knowledge should be integrated with scientific sets of knowledge and methods to develop policies and on-ground activities that can help increase the adaptive capacity of local communities. Local communities can contribute significantly to climate change adaptation planning and decision-making due to their vast experiences in coping with localised environmental conditions and changes (Nakashima et al 2012). Indigenous knowledge across the Pacific consists of valuable insights into managing natural capital and adapting to local environmental changes and extreme weather events. Such rich knowledge can enhance the climate change planning process. It becomes the role of governments to ensure that this valuable knowledge is well documented and effectively incorporated into national policy outcomes and community-based climate change adaptation activities before it is lost.

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