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Valuing Indigenous Knowledge for Climate Change Adaptation Planning in Fiji and Vanuatu

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Summary

Pacific Island communities are heavily reliant on natural resources to sustain their livelihoods and as a consequence they have developed an intimate understanding of their local environment. Communities have been using their knowledge of the land and sea to monitor changes in their local surroundings, use and manage resources, and adapt to local environmental changes and extreme weather events. Increasingly this knowledge is being recognised as a crucial ingredient in community-based climate change adaptation planning. This article explores how three communities in Fiji and three communities in Vanuatu have adapted to local environmental change or events. Some of the strategies used by locals have included: re-vegetating coastal foreshores with native species; careful household preparation prior to cyclones or flooding events; using innovative water storage practices during times of drought; and employing food preservation strategies during times of cyclones or drought. The article seeks to build on discussions concerning the value and importance of Indigenous knowledge in planning for resilient communities in the future.



Aerial View of Tuvalu - Photo Credit Dr Karen McNamara

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Introduction

Across the globe, Indigenous people have been utilising their knowledge about their surrounding environment to adapt to slow-onset environmental change and rapid-onset extreme weather events. Climate change is set to pose significant additional challenges for livelihoods as a result of changing water availability, and shifting patterns of plant and animal life and overall ecological cycles. Indigenous communities in small island

developing states are being encouraged to adapt to the impacts of climate change, and their intimate knowledge of local environments is emerging with considerable importance in the climate change adaptation field (Berkes and Jolly 2001; Ifejika Speranza et al. 2010).

As pointed out by Byg and Salick (2009, 157), 'until recently, local knowledge of climate change and its impacts has largely been ignored by most climate change studies'. Over the last decade, a number of studies have emerged to illustrate the value of Indigenous knowledge to: complement or add value to scientific climate data (King et al. 2008; Lefale 2010); provide culturally and locally appropriate solutions to community-based climate change adaptation (Berkes et al. 2000; McNamara and Westoby 2011); and monitor local climatic and seasonal patterns (McNamara and McNamara 2011; Riedlinger and Berkes 2001).

Indigenous communities have long oral histories of how to adapt to local environmental conditions, events and change (Macchi 2008; Salick and Ross 2009). Communities of the Pacific are no exception with their strong connections to and a sense of identity entrenched in their surrounding local environment. Drawing from their work in low-lying Pacific nations, Bridges and McClatchey (2009, 140) eloquently argue: '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'. This local knowledge in the Pacific, which is deeply embedded in practice and belief systems, is a crucial resource, not only 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. While this knowledge has been passed down from one generation to another through songs, dance and sharing practical know-how, it is rarely formally documented.

Communities across the Pacific Island region have long been adapting to local environmental change by employing various strategies. Unfortunately, these Indigenous ways of knowing about natural resource management and local adaptation strategies are typically missing from vulnerability assessments, at both the global level (through the Intergovernmental Panel on Climate Change reports) and at the community scale. This article documents some of this knowledge to demonstrate how Pacific communities can provide valuable, appropriate and effective strategies to climate change adaptation. In-depth interviews (n=40) were conducted with community members from three villages in Fiji (Naselesele, Qeleni and Yanuca) and three villages in Vanuatu (Piliura, Tassiriki and Lonamilo). As this article details, this knowledge is key to enhancing adaptive capacity and planning community-based adaptation activities.

Adapting to coastal erosion and sea level rise

Coastal erosion was identified by research participants as one of the major environmental challenges impacting on communities in Fiji and Vanuatu. For these communities, the loss of coastlines and beach berms was concerning. Adding to the problem, inundation during high tides has impacted on coastal plants that are not salt tolerant and caused further erosion. Two of the Fijian communities participating in the research have settled along the coastal foreshore and have responded to the problems of coastal erosion in several ways. First, they have constructed small-scale seawalls along some parts of the foreshore. They have also planted grasses and trees along the coastline and relocated their houses ('bures') further inland.

Similarly, communities in Vanuatu 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. As illustrated in Plate 1, 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.



Plate 1: Planting grasses and trees in front of and around large unstable trees on the foreshore in Piliura village, Vanuatu (Photos: Karen McNamara)

Encroaching sea levels are also having a negative impact on some coastal communities in Fiji and Vanuatu. At particular times of the year, especially during king tides, roads are flooded in some communities and this inundation of salt water can also reach community gardens and destroy crucial vegetable supplies. Locals of the three Fijian communities have built their houses on stilts to help keep flood waters away, particularly during periods of heavy rain. In Yanuca village in Fiji, locals have moved their gardens further inland to reduce the exposure of vegetables to salt spray during storm surges and the risk of an increasing number of inundation events and sea level rise.

Adapting to cyclones

The annual cyclone season for both Fiji and Vanuatu is from November to April. Various strategies have been adopted by community members to cope with cyclones. It is predominately the job of the women in the village to collect preserved canned foods, emergency items (such as torches, radios and kerosene) and water supplies. Men, on the other hand, are responsible for securing the houses, livestock (if any) and plantation crops. To secure thatched houses, locals weave and tie banana leave veins with green coconut leaves and use them to cover the thatched roofs to keep them intact. For iron roofs, heavy cement bricks and sacks filled with sand are secured onto roof tops. Boats are brought closer to the shore and filled with water so that strong winds don't turn them over and cause possible damage, and tenuous branches near houses are removed.

If required, the elderly, women and children are evacuated to cyclone-proof buildings. Lonamilo village in Vanuatu consists entirely of thatched houses. Locals have built a limited number of special shelters for evacuation, called 'hurricane houses', which are constructed using bamboo, wild cane and coconut leaves and are known to withstand strong winds. To reduce the impact of strong winds and protect the village, the local community has also planted 'burao trees' around the village compound that act as a wind break.

To reduce damage to plantation crops – which are crucial for communities' food security – 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 by women in Piliura village in Vanuatu. For instance, cassava is preserved using a drying technique. The cassava is grated, mixed with coconut

cream and then cooked on stones to dry – allowing it to last 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. Communities depend on these fast-growing food crops while they rebuild their gardens.

Plate 2 depicts some of the strategies used by communities in Fiji to prepare for a cyclone.



Plate 2: The turaga-ni-koro ('village headman') in Naselesele village in Fiji indicates the appropriate height to prune cassava plants prior to a cyclone (left); and securing roofs using bricks in Qeleni village in Fiji (right) (Photos: Karen McNamara)

Adapting to droughts

Droughts and water shortages affect many communities throughout Fiji and Vanuatu. Consequently, local communities have developed creative ways of securing their food and water supplies during these difficult times. Drought conditions usually cause the suckers of the young taro (called dalo in Fiji, a prominent root crop) to die. Farmers pull out the mother taro, as this technique prevents the suckers from dying. Each year, before the dry season, farmers in Fiji plant certain 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 plants are known to survive seasons with low rainfall and provide a secure source of food. Tivoli and kumala grow throughout the year and are often used in times of drought to replace vegetables.

The three communities in Vanuatu grow food crops that are known to be drought-resistant, including tavioka (cassava), tivoli and certain varieties of bananas. 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 use certain plants such as *Narara Erythrina* and *Gliricidia Sepium* to shade low-lying plants, particularly green leafy vegetables. The local community also consumes wild edible plants to replace vegetables, such as napalanku, ialken-apen and karwatu (see Plate 3). These wild plants are used as an alternative source of nutrients. The knowledge of locals on selecting appropriate crops to be cultivated during periods of limited rainfall and drought have been successful in providing communities with adequate and secure food sources.



Plate 3: Diversifying crops is a critical food security strategy used by local communities in Fiji (left); wild cassava is consumed during periods of drought in Naselesele village in Fiji (middle); the ialken-apen fern is consumed to replace vegetables during dry conditions in Lonamilo village in Vanuatu (right) (Photos: Karen McNamara)

To secure water supplies during drought, locals across all six villages collect water from springs located near the villages and store it in tanks or large containers. Communities also rely on groundwater wells for cooking and washing. In Lonamilo village in Vanuatu, the community faces regular water shortages. The village is located inland and relies on a slow-running stream for their water supply. Given the slow water flow, numerous trips to the stream are required each day. This water source is not secure and stops running on a number of occasions throughout the year. The community then temporarily moves to the coast and makes provisional, short-stay houses. Water is collected during low tide from springs along the foreshore, which is then stored in containers and used conservatively for drinking, cooking and washing. The rainy season results in a revived stream and the community moves back to their inland village.

Adapting to floods

Rivers run through Qeleni village in Fiji and Lonamilo village in Vanuatu, which often flood (see Plate 4). Flooding events can cause serious damage to water pipelines and impede water supply, as well as damage food supplies, houses and property. During these periods, local communities rely on wild crops (such as tivolli) from the bush and fish from the ocean, relying on their local fishing knowledge, which includes for example the knowledge of the dabi tree, passed on from the ancestors. According to observations, the leaves of the dabi tree, which are normally dark green, sometimes turn red, which indicates that there are plentiful octopus and crab on the reef straight out from the tree.



Plate 4: The turaga-ni-koro in Qeleni village in Fiji shows the height of the last river flood (left), which is a result of the close proximity of the village to the Qeleni River (right) (Photos: Karen McNamara)

Some of the locals in Qeleni village in Fiji have built their houses on stilts. Any new houses are built on higher grounds, to avoid the risk of flooding. The locals of Lonamilo village in Vanuatu have also devised a few strategies to cope with flooding events. At a household level, families have built their houses on stilts about 20cm above ground level, relocated their gardens further inland, and invested in more tanks to collect rainwater for drinking and cooking. During the rainy season, locals grow bananas, water taro, cassava, kumala and a variety of yams in their gardens located on higher grounds. They then dig nearby channels to minimise the damage of floodwaters to their crops. The community also assists those affected by moving their household items to higher ground, rebuilding damaged houses and replanting gardens.

Concluding remarks

Climate change is a concern and challenge for numerous Pacific communities. These communities are already experiencing some of the detrimental impacts of climate change on their food and water supplies, health and overall livelihoods. Solutions need to be forthcoming. This article has provided a brief snapshot of some of the valuable local knowledge present in six communities across Fiji and Vanuatu. This knowledge on how to adapt to changing environmental conditions as a result of sea level rise, cyclones, droughts and flooding needs to be integrated into climate change adaptation plans at the community level in the Pacific. Such knowledge is a valuable and critical part of the solution to the impacts of climate change.

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Endnotes

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