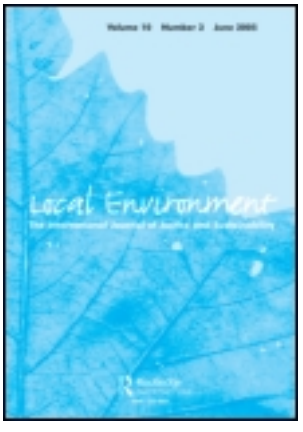

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Local knowledge is a valuable asset in observing and managing environmental change, and importantly, is an unheralded source of adaptive capacity. Torres Strait Islanders are no exception, having used such knowledge to adapt to biophysical changes in their environment for centuries. This article explores the ways in which Islanders have coped in the past with environmental changes to plan for their future. This article focuses on Erub Island in the eastern group of islands in the Torres Strait and charts the adaptation actions or activities employed by respected locals (Elders and Aunties). Drawing on their local knowledge, these actions or activities have included the building of rock walls and wind breaks, using native species to re-vegetate sand cays and the coastal foreshore, applying self-sufficient practices such as fish traps and gardening, reading and respecting country, and transferring this knowledge to the younger generation. In this way, it is the Islanders themselves who detail, based on their local knowledge, what is most appropriate for their community.

Keywords: adaptation; capacity; climate change; Torres Strait; traditional knowledge

Introduction

Environmental change is not a new phenomenon, neither is the ability of communities to manage and adapt to changes in their local environment. This is indeed the case for Torres Strait Islanders who have long managed their land and sea county and adapted to biophysical changes in their environment. In the context of climate change, adaptation is concerned with modifying ecological and social systems to accommodate changes in the climate to ensure the persistence of these systems over time. Campbell and de Wet (1999, p. v) defined adaptation as: "Those actions or activities that people, individually or in groups, take in order to accommodate, cope with or benefit from the effects of climate change". This article documents these adaptation actions or activities from the past and present, which have been employed by locals on Erub (Darnley) Island in the Torres Strait. The ways in which Islanders have adapted to these changes are important to consider when planning future culturally appropriate actions or activities.

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Local knowledge as an asset in environmental management and adaptation

The local knowledge of people and communities is a critical element in developing adaptation actions or activities and managing the environment more broadly (Berkes *et al*. 2000). The Intergovernmental Panel on Climate Change (IPCC) has identified local knowledge as an important, yet to-date overlooked component of its previous work and assessments. In an attempt to rectify such an omission, the IPCC has confirmed that it will focus on local knowledge regarding the impacts of climate change and variability for its next assessment process (United Nations University 2010). As defended in a recent IPCC report, incorporating local and Indigenous knowledge into the climate change dialogue can result in the "development of effective adaptation strategies that are cost-effective, participatory and sustainable" (Boko *et al*. 2007, p. 456).

A vast number of contemporary projects have highlighted the adaptive capacity of Indigenous communities in the face of changing landscapes and natural environments. Climate Frontlines, an initiative of UNESCO, has documented numerous projects that highlight the adaptive capacity of small island nations in the Pacific, Southeast Asian countries and individual communities across Africa. In the Fijian islands, communities are transmitting valuable knowledge, inter-generationally passed down, which details adaptive capacity mechanisms from past extreme weather events. This sharing of knowledge has been used to plan for future extreme weather events in Fiji. Traditionally, houses were built with local materials and were collapsible for protection against cyclones, and emergency food was always stored, referred to as "hurricane food". Through Elders' accounts, this knowledge has provided valuable adaptive potential by way of future planning for increased extreme weather events (UNESCO 2009).

A study by Dumaru (2010, p. 751) in Druadrua Island, Fiji identified that a "renewed focus on community adaptive management of natural resources, increased awareness of climate change, and an increase in the community's access to resources from external organizations" will enhance community adaptive capacity. While focusing on vulnerability and climate change, Ford *et al.* (2006) conducted research using comparable participatory methodologies to document the adaptability of Inuit communities in the Arctic. This adaptability was found to be borne out of strong traditional Inuit knowledge, robust social networks, flexibility in hunting cycles and adoption of some modern technologies (Ford *et al.* 2006). Moreover, such an example demonstrates the importance of incorporating local and context-specific knowledge in the development of culturally appropriate and asset-based climate change adaptation actions or activities (see also IUCN *et al*. 2003, Twigg 2007). Such an approach should not be underestimated. Local communities should drive decisions about adaptation, and draw on local resources and knowledge in order to promote locally appropriate responses (Dumaru 2010). Such an approach recognises that people in local settings are key resources not to be overlooked; instead, they should be the focus. Building capacity at the local level to reduce disaster risk and increase adaptive capability fosters a sense of ownership and control over such initiatives (see Mercer *et al*. 2008).

As a starting point, this project was envisioned as representing Torres Strait community knowledge as an asset in environmental management. In other words, rather than representing Torres Strait Islanders as "victims" of climate change, this project envisioned them as active "agents" with valuable environmental knowledge (see Salick and Ross 2009). It is anticipated that the overall findings of this research project will be useful to stakeholders and community leaders explicitly addressing climate change issues in their everyday activities. It is also envisioned that more broad-based discussions about these issues will lead to recognition of the value of this local knowledge within the broader community.

Project aim

The aim of this research project was to assess the role of local knowledge in enhancing adaptive capacity to environmental change in a small community in the Torres Strait region. Our role, as the research team, was to record and synthesis this knowledge. Reflecting on this knowledge of adaptation actions or activities, this article makes an assessment of the capacity of the Erub Island community to cope with environmental change and disruption, particularly climate change and variability.

The findings presented in this article are based on the ideas, beliefs and knowledge of Elders, Aunties and young Islanders. This article does not weigh up the scientific or technical merit of each adaptation action or activity, but rather it documents the findings of in situ interviews and stories shared by community members. In this way, it is the Islanders themselves who outline the actions or activities that they believe to be most appropriate and effective for their community and surrounding environment, based on their local knowledge. While colloquial terms, "Elders" and "Aunties" are the reverential titles used in Torres Strait communities for respected men and women in the local community who are leaders of the older generation and play an important role in island life and culture. They are considered by the community to be the caretakers of knowledge and responsible for transferring this knowledge to younger Islanders. While in international usage, Elders might refer to both men and women, in Torres Strait communities, Aunties is used as the local respectful term for women. Erub Island community leaders were approached to help in identifying these key respected men and women, and holders of knowledge in the community.

This article seeks to provide an avenue for better understanding local practices of adaptation to environmental change, particularly climate change and variability. For Torres Strait Islanders, the connections between land, sea, environment and culture are paramount to their identity, livelihoods and sustainability (Rose 2009). Thus, this research goes some way in ensuring that knowledge about adaptation is not only safeguarded, but can also facilitate decision-making about the development of culturally appropriate adaptations, and importantly, Islanders' futures.

Study site

This article joins the debate concerning the value of local knowledge in understanding climate change impacts, variability and adaptation capacity (see Boko *et al*. 2007, Salick and Ross 2009, McNamara *et al*. 2010, Green *et al*. 2010b). We focus our attention on one particular island in the Torres Strait, a region situated between the southern coastline of Papua New Guinea and the tip of Cape York on mainland Australia. The region, home to a unique set of histories, traditions, laws and customs, consists of over 100 islands spread over 48,000 km^2. In 19 communities and across 16 inhabited islands, there are approximately 7,105 Torres Strait Islanders living in the region (Human Rights and Equal Opportunity Commission 2009).

Erub Island is the focus of this article, located in the eastern group of islands in the Torres Strait. Erub is an island formed by volcanic action and hence is a "high" island. However, as is widespread across the region, considerable infrastructure, housing settlements, and cultural sites lie on the low coastal fringe. There are approximately 400 people living on Erub Island, which is a key site in the movement for adequate recognition of the land rights of Islanders. There are only a few people who still speak Meriam Mer, the traditional language, with Torres Strait Creole and English being the prominent community languages (ABS 2006, TSRA 2011).

Numerous studies have been conducted with the people of Erub Island and other Torres Strait Islands. Research shows that the people have a deep connection to the land and sea to which they are a part of (see Anderson 1996). Customs, rituals and management practices all take place on the islands to ensure that country and the people remain healthy (Scott and Mullrennan 1999, McNiven 2003). Clear evidence exists, from the past and present, of an environment that is deliberately and strategically constructed and managed (McNiven 2008).

In general, the Torres Straits region holds special significance in the protection of land rights, but it is also gaining visibility as a site experiencing a shift in climatic patterns. The 1992 High Court decision to grant Native Title to traditional owners on Mer Island, overturning the century-old legal doctrine of *terra nullius* (popularly known as the Mabo case) and triggering the Native Title Act and a series of land claims, is probably best known internationally and nationally as a means to identify the region (see *Mabo v Queensland* 1992). However, the Torres Strait has more recently gained media and policy visibility in relation to large king tides and other inundations linked to climate change. While not the focus of this article, details of the latest scientific research concerning climate change impacts and variability across the Torres Strait region have been summarised elsewhere (see Duce *et al*. 2010, Green *et al*. 2010a). Differentiating itself, this article draws on Erub Island as a case study to uncover some of the ways in which local, place-based environmental knowledge can enhance adaptive capacity.

Methodology

The primary method used for this research project was in-depth interviews. Interviewing is an important primary methodology to capture various interpretations of a range of opinions, memories and experiences (Pile 1992, deMarrais 2004). The in-depth interviews conducted were open-ended and conversation-like, making them more unstructured in character and delivery (May 1993, Rice and Ezzy 1999). Probably the best description of the style of interviews delivered was a guided and fluid conversation (Lofland and Lofland 1994, Dunn 2005). While these interviews were conversation-like, the interview remained geared towards the interviewees' research interests and research process (Minichiello *et al.* 1995).

Drawing on feminist and Indigenous critiques of research–subject relationships and interviewing techniques, this project was concerned with the important considerations and nuances of working with Indigenous communities. Louis (2007), in an assessment of the use of Indigenous methods in geographical research, argued that it is crucial for Indigenous communities and people to actively engage and participate in the research agenda and outcomes. The interviews were conducted in informal settings, allowed for storytelling to evolve, and connected with emotional and nonverbal communication techniques. Such endeavours were crucial in order to maintain positive research relationships, and capture multiple and diverse ways of knowing (Kovach 2005, Sprague 2005). The ideas and views elicited from this research is not knowledge to be possessed or owned commodities, a major criticism of work carried out in the past with Indigenous communities (Smith 1999). Rather, the evolving knowledge shared is a testament to Erub Islanders' experiences, and importantly, this has now been safeguarded (by depositing reports in the local council and library) and incorporated into future learning (through the development of teaching curriculum at the local school).

In total, 17 in-depth interviews were conducted by one co-author with community Elders, Aunties and younger Islanders over three fieldtrips to Erub Island (in September and November 2009 and May 2010). These interviewees represented the four clan groups on Erub Island – Samsep Serar, Meuram Beuger, Perudu Waumer and Saisarem Karr. The length of interviews ranged from 20 min to 2 h. All interviews were digitally

recorded with the exception of two, which were written down on paper. Careful planning was put in place to incorporate gender and generational balances in the research project. Eight Elders, five Aunties and four young Islanders were interviewed. The knowledge that emerged through these interviews included a variety of adaptation actions or activities, which will now be discussed in detail.

Adaptation actions or activities

The Elders and Aunties identified a number of environmental changes or processes on the island and ways of adapting to such, which will be explored in this section. Drawing on local knowledge, this section explores the actions or activities that the community of Erub is undertaking to enhance their adaptive capacity to environmental change. These actions or activities have included the building of rock walls and wind breaks, using native species to re-vegetate sand cays and the coastal foreshore, enhancing self-sufficient practices such as fish traps and gardening, reading and respecting country, and transferring this local knowledge to the younger generation.

Knowledge of local environmental processes and ways of reducing coastal erosion

Elders and Aunties provided detailed knowledge of their local environment, particularly the coastal system. Knowledge was also revealed in terms of rainfall patterns, and wind directions and timing. In the first example provided below, the beach along the main coastal stretch of settlement on Erub Island is a closed system, such that there is little sand being deposited in the system. Compounding this situation, houses are located very close to the shoreline on Erub Island (see Figure 1), which is now encroaching closer towards these properties. To counteract these issues, there was a strong commitment by Elders and Aunties to use local materials to build rock walls and wind breaks to minimise the removal of beach sediments, likely to be a result of tidal currents and wave action. In interviews, people spoke of the need to use materials that are locally sourced. Utilising this local knowledge and sourcing local natural materials enables communities to rely less on resources from mainland Australia, which can ultimately build community adaptive capacity and self-sufficiency (Curtis 2003).

A number of Islanders have taken measures on their properties to minimise the movement of sand or reduce the impacts of strong winds, particularly the south-westerly winds. One

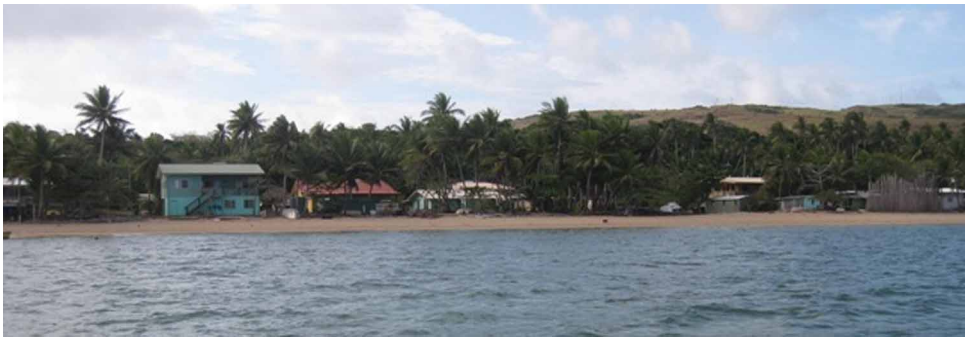

Figure 1. (Colour online) Community settlement and infrastructure, including bamboo wind breaks, along the coastline of Erub Island.

Elder, drawing on his knowledge of coastal processes, has used local materials to minimise the impacts of strong winds and retain the sand on his beachfront property, largely by building a groin rock wall on one side of his property: "The stonewall was to stop the sand from moving around to the pier there, keep sand here on beach" (Elder, personal communication, 2010). For another Elder interviewed, using natural and local materials for wind breaks has also been effective in minimising coastal erosion on the island foreshore: "You could have put in the natural, the way the Islanders always do; with natural windbreak where the logs get buried upright and that will help slow down the erosion" (Elder, personal communication, 2009). One Aunty described how the strong winds and high tides have been causing the movement of sand. By practically applying this local knowledge, she has built a bamboo wind break along the front of her property, directly adjacent to the beach:

> It'll stop the sand going out, just that if it's a king tide, it will come up, but the sand will stay in, and it won't come right up to the house . . . It is a wind break plus it will build up the sand . . . They have to soak it [bamboo] in the water for a few days, salt water, so it won't get rust easily, and then put it up. (Aunty, personal communication, 2009)

According to the Elders and Aunties, these actions have been successful in minimising sand movement off-shore and reducing the impacts of strong winds, which has allowed communities to continue living on the islands' coastal fringes. Figure 1 shows the beachfront of Erub Island, taken in November 2009, illustrating the close proximity of community settlement and infrastructure to the coastline, and the use of local materials for wind breaks. These discussions not only detail the materials used to manage coastal changes on Erub Island, but importantly, highlight the available local knowledge concerning coastal processes, change and effective adaptation. This knowledge is not only being applied at present but it is also valuable for future planning.

A second example whereby Islanders have applied their knowledge of local environmental processes to reduce impacts in coastal areas has been the use of native vegetation for erosion mitigation. Re-vegetation to combat erosion is recognised as a significant adaptation activity to the impacts of climate change. For instance, programmes in numerous communities, including the Mekong delta in Viet Nam recognise this as an essential adaptation tool to minimise the impacts of tropical cyclones, protect freshwater aquifers from inundation, and shield homes and land from substantial erosion (Department for International Development 2004). An additional benefit from such initiatives is that the restoration and re-vegetation of mangroves and coastal zones create habitat for fish, crustaceans and birdlife, which can inadvertently improve food security and livelihoods in the long-term (International Institute for Sustainable Development 2003).

In the case of Erub Island, Elders in particular provided details of current projects and future plans for re-vegetation, particularly on foredunes, mangrove ecosystems and crucial sand cays; illustrating adaptive capacity. Such actions or activities directly combat future erosion due to increasing extreme weather events and more severe tidal influx. There was a common understanding by Elders that more re-vegetation is needed to combat erosion along the islands' foreshore, and plans are underway to ensure this happens. This understanding is reflected in the following quote that draws on local knowledge to provide practical solutions to help combat coastal erosion and impacts from sea-level rise:

> Creeper around on the foreshore, they there to hold the sand, so when the wind or tide blow the new sand over them, and they grow through again, then you elevate the land through its natural ways. You don't go and bring a backhoe down there, there was no need for it; this is what nature is doing. (Elder, personal communication, 2009)

This Elder also provided a recent example of how he involved members of his community to protect and stabilise East Sand Cay near Erub Island by planting three different native grasses and sand runners:

> I urge people to take them natural grass, traditional grass and go and plant them and that's how the sandbar will retain and will keep the level above sea-level, as the water rise, they go up too . . . There was no need for any machinery to go and shovel sand in a stockpile. It built itself up, because that grass had been there before. (Elder, personal communication, 2009)

This Elder, drawing on his local knowledge, provided insights into the best ways to manage the coastal foreshore. The cornerstone of this Elders' knowledge was based around leaving nature to rejuvenate itself with little human interference. Figure 2 illustrates the re-vegetated and stabilised East Sand Cay, highlighting the recreational benefits for local Erub Island community members.

Knowledge of self-sufficient food security practices

While some locals continue to utilise their local knowledge to harvest produce from the stone fish traps and gardens, it was evident from interviews that people wanted to ignite a greater interest in pursuing such practices. The core reason for wanting to pursue such practices was a desire to garden together, grow a diverse range of food crops for individual consumption and to share, and ultimately, enhance food security. The concept of community gardens is well documented as an effective avenue for people to come together not only to share food, but to build ideas and create a sense of community (Hancock 2001). Such an activity can build adaptive capacity by establishing healthy communities, and creating

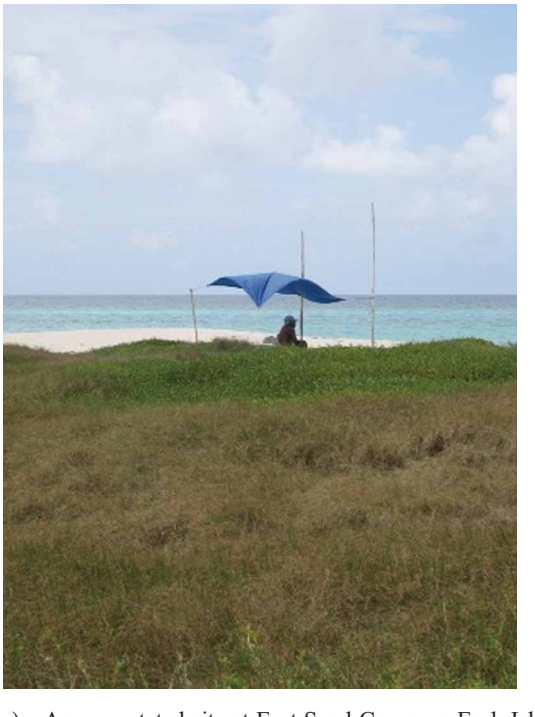

Figure 2. (Colour online) A re-vegetated site at East Sand Cay, near Erub Island.

space for people to talk about changes and potential adaptation approaches. These and other ideas are voiced in the following quotes and at their core is a desire to increase community capacity to cope with future changes (Osman-Elasha *et al.* 2006).

Tidal fish traps have been constructed by Islanders in the past and are marked by rock walls sometimes hundreds of metres long that trap fish as the tide recedes (Scott and Mulrennan 1999). One Elder shared his local knowledge of the fish traps on the island, including their age, and how they operate and should be maintained:

> Every fish trap, every clan or family member owns a fish trap. When the time for the fish trap to be [up kept], every family goes there, do maintenance, whatever need to be done. You only do it on certain time of the tide . . . When I see the changes in the tide I know in the next couple of days I need to fix up all the crack in the fish trap . . . Then you get the fish you need. After that you let it open again . . . They're probably three or four hundred years old. (Elder, personal communication, 2010)

This account demonstrates how the fish traps are maintained and how they have been utilised to sustain Islander sustenance and livelihoods. Elders' emphasised the need to move away from modern technology, and instead, further restore these practices in the community. Figure 3 depicts the tidal stone fish traps that are located in the coastal zone of Erub Island.

In terms of enhancing food security, using and maintaining community gardens was considered an important component of Islanders' daily lives. One Elder summarised the main reason for wanting to encourage more gardening in the community:

> It's really nice to get the whole community up and running on gardening or take them kids out to explain to them what sort of plants that you eat and certain plants and certain time of the year. We grew up with that. (Elder, personal communication, 2010)

One Aunty revealed in an interview the story of how she used to be involved in gardening activities with her family, and how her knowledge (planting and cropping times

Figure 3. (Colour online) Stone fish traps around Erub Island.

and maintenance techniques for both gardens and fish traps) was passed down from her parents:

> When I was little, my father and mother always telling us we must plant in that September, October, because it's summer time and you have time to do all your gardens . . . And on the sea, Dad always mentioned to us that when the tide's going out, when it starts to go out, they could build a stonefish trap up . . . That's our lifestyle traditionally; our custom. (Aunty, personal communication, 2010)

There were many similar sentiments from Aunties in interviews. For one, it was made clear that the food from the gardens was plentiful and healthy. One Aunty talked about respect for others, property and peoples' gardens. Another Aunty made reference to the changes to the local environment of Erub Island, and the waning community interest in gardening over time. A similar story about working in the gardens, sharing as a community and growing some crops all year round also came from another Aunty.

Young Islanders interviewed also expressed a desire to connect further with gardening practices and the sustainability of such an activity:

> Maybe in another twenty years time we won't be catching fish like we do now. Plant a garden around the island, veggies and fruits, keep on planting as will hold the earth too, that will stop erosion on the island. (young Islander, personal communication, 2009)

This quote is an important conclusion for this section. It highlights the need to enhance self-sustaining and sustainable fishing and gardening practices, based on local knowledge of seasons, and climatic and environmental conditions. These activities have the potential to build adaptive capacity as they help: establish healthy communities; create food security pathways; encourage a sense of community; and provide a space to discuss local environmental changes and potential approaches to adapt to such.

Knowledge is the basis for reading and respecting country sustainably

For many Elders and Aunties interviewed, the theme of reading landscapes and the importance of recognising and responding to environmental indicators, which highlight change, shifts or triggers was very pronounced. Building on this theme further is the concept and practice of treading lightly and maintaining respect towards land and sea country. "Country" is used here in recognition of how Torres Strait Islanders themselves refer to the environment that they are a part of. Denoted not only as the physical elements of sea and land, but country is also the dyadic spiritual and cosmic relationship that Islanders have with the natural environment (Burgess *et al*. 2005, Arabena 2008). For the people of the Torres Strait, caring for country involves reading and managing their local environment. To do this requires significant local environmental and climatic knowledge, along with refined customs, rituals and management practices within the community (Scott and Mullrennan 1999). Through reading, respecting and managing country, both the health of the community and local environment are ensured (Anderson 1996). Burgess *et al*. (2005) described how in remote areas in northern Australia, Indigenous natural resource management activities can provide social benefits such as enhanced sustainable employment opportunities, education and community cohesion. This section details how reading and respecting country can facilitate and enhance the adaptive capacity of the Erub Island community.

For one Elder, reading country remains to be an important process to follow the onset of seasons, as well as hunting, planting and cropping times. The Elder described the role of the

frigate bird as an indicator of the start of the monsoon season: "They [frigate birds] on the monsoon time, when we see them come low, we know monsoon come close" (Elder, personal communication, 2009). A number of Elders provided details on reading their country. This reading of country has changed over time from being predominately based around stars and constellations, to biological indicators, as one Elder described:

> We know which star when the high tide we know which star to follow. On the low tide they change . . . Like we call that star "Southern Cross star", today they call it Tagai and named the school after Tagai . . . Like Biru Biru and the Torres Strait Bird now. Those birds they can tell a lot of things about it. (Elder, personal communication, 2010)

This Elder also explained his knowledge of reading triggers in the landscape, for instance, when to go out turtle hunting. In his discussion of this, the Elder explained that the current turtle catch must have regard for traditional hunting protocols and respect for the balance of the ecosystem, also emphasising the need for such knowledge to be transferred to the younger generation.

> Turtle doesn't come any time. They got season for it . . . Before the mating season we always go for the male one. They got more fat and more meat, better. After mating or time of mating they after them female ones . . . The prevailing southeast, that's the time you look for the male one. So when we catch a female one during the time we let it go . . . We learn from the older people, care for them too, not too greedy on it, just take enough. (Elder, personal communication, 2010)

Another Elder described how having knowledge to "read" your land and sea country, including seasons, tides and the moon are important for planting and cropping times. This same Elder talked about the value and importance of connecting to country and through that, respecting such landscapes. Caring for country can stimulate physical activity and improve diet as well as autonomy and self-esteem, which importantly can improve the health of people.

One Elder spoke passionately about traditional laws on the island; for people to respect and live in harmony with their land and sea country. As the Elder stated:

> All island laws, them natives are perfect in them laws, it didn't happen overnight, it took them blood, sweat, tears to put them things for so many generation in place and when they were in place, everything ran . . . The laws they said, you got time for eat certain things; certain things you got around the calendar and you give everything a chance to rejuvenate or reproduce . . . Everything has survived because you stuck to the calendar, them ancient people . . . When them things are left, when you've got a simple law from Eastern Island; it mean take enough and only enough, you got more day tomorrow. (Elder, personal communication, 2009)

For this Elder, the theme of respect was very obvious and embedded within the community structure, subsequently enhancing community capacity to adapt to environmental change.

Respecting land and sea country was paramount for one Aunty who described how respect for catch, for instance turtle, needs to be maintained on Erub Island, reflecting past respectful and sustainable practices:

> Like if the boys go out hunting for turtle and they come and cut it, you have to respect the thing. You must eat everything that's good from that thing. Maybe do things like that and with other animal that you eat, you have to get respect for them. It's bad if you kill that thing and then just eat the one part of it and throw the rest away. We try to teach them kids to respect, even if you like to hunt for dugongs or things like that. (Aunty, personal communication, 2010)

A very similar sentiment came from another Aunty in an interview about respect for land and sea country and how this translates into actions:

> Our culture is take enough and leave enough for the next day. That's the way you preserve them thing for the next generation . . . By doing this, people will really know our identity and how we will respect towards the sea and the land . . . Like for the clam shell, when we take off the meat, we turn the clam shell belly down, so another animal can come and live under there. (Aunty, personal communication, 2009)

Listening to country and reading landscapes are the hallmark of Indigenous science (Cajete 2000). According to Berkes (2008, p. 161), reading country is part of "ways of knowing", which can then be applied to care for and provide custodianship of local environments. This section has provided a discussion of the importance of reading country and recognising indicators in the local environment, as well as the need to sustainably manage and respect such environments.

The need to transfer local knowledge

Transferring knowledge, which has been gained through the close relationship of Islanders with their land and sea country, is an essential component of the adaptive capacity of the Erub Island community. The knowledge of Elders and Aunties, as documented throughout this article, highlights the care and custodianship of country. While this knowledge is essential, it is imperative that it is passed on and continues to incorporate new understandings and experiences. The following quotes highlight the commitment of Elders to share and transfer knowledge, as well as the assurance of young people on Erub Island to embrace this knowledge.

From interviews, Elders were committed to share and transfer knowledge to the younger generation. One Elder spoke of the value and importance of documenting, safeguarding and transferring knowledge and ideas. The Elder powerfully argued that:

> The richest port in this planet Earth is not the oil field in Kuwait and is not the diamond mines in South Africa, but the most valuable thing is in your local cemetery. That's where you, people way below know them things, but they never written down, a song they never sung, that understanding and that invention what they got, it never got beyond the drawing board . . . The little understanding you got, you know, about those things, do it and help for your community. Tell young people about it, show them. (Elder, personal communication, 2009)

For another Elder, in discussions about strengthening the Erub Island community, transferring knowledge and understandings of clan totems was crucial to this process, making the following case:

> You see to tackle this sort of thing; the traditional knowledge must be passed down. So, then you involve them you say, the Elders said "this is what we have to do". That's only come by traditional knowledge, and you understand your culture, what you are to do because you want to protect the environment for the totems here but also your food source. Someone else's totem is someone else's food source. Like, I from booby clan, I won't touch them but someone else will, because I'll go and take another over there, eggs from another bird, someone else's. So, there's a rotation, no-one is going to one type of thing . . . That knowledge needs to be taken to the school, the parents need to bring in the children to see their environment and they respect and learn laws; what traditional law connects to it. (Elder, personal communication, 2009)

This quote demonstrates the importance of transferring knowledge between generations. Another Elder also reflected on how his knowledge had been passed down and the

challenges of passing that knowledge onto his children. For another Elder, it was important that the current leaders of the community and region integrate traditional knowledge and past sustainable ways of living into future decision-making for the island.

The younger Islanders also stressed the value of transferring knowledge – about seasons, climate and how to manage environments – to ensure the sustainability of livelihoods on the island in the future. A core argument for many young Islanders was to safeguard and transfer this knowledge because it provides insights into how the Erub Island community used to live and could live sustainably in the future. The following quotes from two young Islanders emphasis many of these sentiments:

> I think it's very valuable for the Elders to pass on traditional knowledge down to the younger generations while they still are alive in the community, especially regarding our seasons, change in this area of the Torres Strait, and how we understand. (young Islander, personal communication, 2009)

> We have seen changes now with the weather patterns and hearing, you know, the Elders talk about it, how it never used to be like that before . . . We are looking at ways now, trying to maintain what we have still, but strong cultural belief also we learnt from Elders is to look after one another. (young Islander, personal communication, 2009)

For the younger Islanders, there was real value in local knowledge being transferred, to allow the next generation to "read" and understand their seasons and landscapes, which can enhance community adaptive capacity.

Commitment to sharing knowledge across generations is also highlighted through the networks that exist on Erub Island that allow for this process to take place. Robust social networks are seen as an essential component to building a community's adaptive capacity (Tompkins and Adger 2004, Ford *et al.* 2006, Macchi 2008). Strengthening social networks can allow for communities to better manage resources and resolve future disputes, and allow for knowledge and information to flow more freely (Woolcock and Narayan 2000). Social networks involve mutual obligations by their members, and can create and strengthen communities (Putnam 2000). Practitioners and policy-makers in a number of countries, for example India, are learning that successful resilience-building to climate change hinges on collaborating and partnering with women and women's groups (International Institute for Sustainable Development 2003). The women of Erub Island have been working together to strengthen the social networks in their island community through the establishment of the group, "Women of Erub Sharing Skill, Knowledge, Experience to Promote Unity". Women living on Erub Island play a crucial and essential role as household, community and natural resource managers.

The following quotes illustrate that there are visible networks emerging among young and older women on Erub Island that allow for knowledge to be shared inter-generationally. Two Aunties provided insights into the importance of these networks in sharing knowledge, and building community unity and capacity to adapt to environmental and socio-cultural change:

> It's important that younger women with children know what it's all about, to learn to crochet, weaving, gardening. (Aunty, personal communication, 2009)

> We will have our meeting on next week sometime, all the woman and that, and then try and get together with that art work and go on from there, because we can do anything, you know . . . This is what we need to do. It's linked to our cultural maintenance. Because if you lose your identity, your culture and that, you lose everything. (Aunty, personal communication, 2009)

The Aunty above reflected on her work at "Erub Erwer Meta" (the "Darnley Island Arts Centre"), which brings women together and provides a network where women can learn, share and work together.

This section has illustrated the commitment of Elders and Aunties to share and transfer knowledge to the younger generation, as well as the commitment of the young people interviewed on the island to embrace and apply this knowledge. Moreover, networks exist on Erub Island, particularly with women, which allows for this knowledge to be transferred between generations.

Conclusion

This article has presented various views and knowledge from Elders, Aunties and young locals on Erub Island, which has highlighted the local adaptive capacity of this community. The collection and collation of this material has provided an alternative visioning of this island community. The findings present a discourse which envisions Erub Islanders as active agents with valuable local knowledge and traditional laws, rather than "victims" of climate change. The knowledge synthesised detailed the actions or activities that Islanders have implemented to adapt to environmental change, including climate change and variability, extreme events and seasonal shifts. These actions or activities shed light on Islanders' ways of adapting to changes and living sustainably. Importantly, this article has outlined the actions or activities that they believe to be most appropriate and effective for their community and surrounding environment, based on their local knowledge.

This article demonstrates that local knowledge, as described by Erub Island community members, is a significant source of adaptive capacity to environmental change, particularly climate change-related impacts and variability. This knowledge is intimately linked to a strong connection to country. Outsiders (policy-makers, government officials and the public) may see the community of Erub Island and other islands of the Torres Strait as being particularly vulnerable to changing environments. This article highlights that while the impacts of climate change and variability are felt on Erub Island, and indeed throughout the region (Green *et al*. 2010a), those interviewed have strong and robust coping mechanisms to reduce their sensitivity to such impacts. While not suggesting that support is not needed from outside, this article offers an alternative lens.

Drawing on the stock of local knowledge held by locals on Erub Island, Elders and Aunties provided insights into a number of actions or activities to enhance their adaptive capacity. These actions or activities have included the building of rock walls and wind breaks, using native species to re-vegetate sand cays and the coastal foreshore, applying self-sufficient practices such as fish traps and gardening, reading and respecting country, and transferring this local knowledge to the younger generation. A final quote, fitting for a conclusion, from one of the Elders reinforces the adaptive capacity of the Erub Island community and points to one of the clear messages of this article – that knowledge to cope and adapt to change does exist:

> The political leaders will be the ones bringing the money in but the knowledge will fix the environment; not only scientific knowledge but knowledge must come from our Elders of the island then funding come and fix them. (Elder, personal communication, 2009)

This quote reinforces that future planning on Erub Island must ensure that: local voices are listened to; local knowledge and laws are respected and integrated into decision-making; and any adaptation actions or activities require not only the consultation of the community, but their

active participation and inclusion. Ultimately, local knowledge and traditional laws are important components in enhancing community adaptive capacity to environmental change.

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