



Traditional Knowledge is Facilitating Climate Change Adaptation in Torres Strait



Compiled by Suzanne Long



Australian Government
Department of the Environment,
Water, Heritage and the Arts



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Executive Summary

Researchers funded through the Australian Government's Marine and Tropical Sciences Research Facility (MTSRF) have worked closely with Torres Strait communities to improve our understanding of both the vulnerability of Torres Strait islands to climate change, and their adaptation capacity.

Traditional knowledge is a valuable asset in observing and managing environmental change, and Torres Strait Islanders are no exception: they have used traditional knowledge to adapt to biophysical changes in their environment for centuries (McNamara *et al.* 2010c). The research results show that traditional ecological knowledge and practices are already helping to facilitate climate change adaptation in the Torres Strait. Incorporation of traditional ecological knowledge and practices into future adaptation plans for the region is likely to increase the chances of adoption and success in terms of building community resilience to environmental change. This story from the Torres Strait contains lessons that are likely to be transferable to traditional island communities facing environmental challenges in many other parts of the world.

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Introduction

The Torres Strait consists of a group of over one hundred islands that spread beyond 48,000 square kilometres¹. Situated between the southern coastline of Papua New Guinea and the tip of Cape York on mainland Australia, the region is home to a unique set of histories, traditions, laws and customs. Some 7,105 Torres Strait Islanders reside in 19 communities across 16 inhabited islands (Human Rights and Equal Opportunity Commission, 2009). By comparison, it is estimated that there are over 47,000 Torres Strait Islanders living throughout mainland Australia (ABS, 2006).

The Torres Strait region holds special significance in the protection of Indigenous Australian culture and land rights, but is also gaining visibility as an important site of climate change and adaptation (McNamara and Parnell, 2010). For Torres Strait Islanders, the connections between land, sea, environment and culture are paramount to identity, livelihoods and sustainability (McNamara *et al.* 2010a). Of the inhabited islands, the four central coral cay islands and two low-lying coral-based islands with sedimentary overlay have initially been identified as most vulnerable to climate change impacts, due to their generally low elevation above sea level (Green *et al.* 2009).

Indigenous populations and small island states have been identified by the Intergovernmental Panel on Climate Change (IPCC) as the two groups most vulnerable to the impacts of climate change and climate processes (Parry *et al.* 2007). The IPCC Working Group II made specific mention of the 'particular' vulnerabilities of the Indigenous populations of New Zealand and Australia, characterising them as having reduced coping abilities and adaptive capacities due to social and economic disadvantage. This has led to the common perception that communities such as those in Torres Strait are not only less resilient but more vulnerable to climate change (e.g. Green *et al.* 2009). However, McNamara and Parnell (2010) found that such assumptions make little note of community resourcefulness, or importantly, the ways in which Torres Strait Islanders have adapted to environmental changes in the past, which could assist in the development of culturally-appropriate adaptation strategies. They also note that current mainstream assumptions about the vulnerability of Torres Strait to climate change could become so entrenched that such assumptions could even considerably hamper community capacity for resilience and adaptation (2010).

There is increasing recent international recognition that Indigenous observations of seasonal change could serve to inform culturally appropriate adaptation strategies (Green *et al.* 2010). The IPCC has identified local knowledge as an important missing element in its previous assessments and a focus of its work for its next assessment process, stating that the incorporation of Indigenous knowledge into climate change policies can lead to the development of effective adaptation strategies that are cost-effective, participatory and sustainable (Parry *et al.* 2007)². The same report acknowledged that the long-term place-based adaptation approaches developed by Indigenous peoples provide valuable examples for the global community of low-carbon sustainable lifestyle, critical to developing local adaptations strategies in the face of climate instability. Local communities should drive decisions about adaptation strategies, and draw on local resources and knowledge in order to promote the ownership of locally-appropriate responses (Carney, 2002). In addition, building capacity to adapt to change based on the 'local' fosters a sense of ownership and control over adaptation measures (Korten, 1990).

Approximately \$1.6 million in MTSRF funding was invested in Torres Strait research³ over the period 2006-2010. The latest scientific research relevant to climate change impacts and

¹ See <http://www.tsra.gov.au/>

² http://www.unutki.org/default.php?doc_id=175

³ http://www.rrrc.org.au/mtsrf/theme_1/program_3.html

adaptation in Torres Strait has been summarised elsewhere by Green *et al.* (2009) and Duce *et al.* (2010). The present report summarises recent work of MTSRF-funded researchers, uncovering some of the ways in which traditional ecological knowledge is already and can further enhance community resilience and capacity for adaptation to climate change in the Torres Strait.

Traditional ecological knowledge in Torres Strait

In recent years there has been increasing recognition of the importance of local Indigenous knowledge and observations as a vital source of environmental information in places where little historical data exist⁴, including in Torres Strait (Green *et al.* 2010). For a Torres Strait Islander, being able to ‘read’ one’s land and sea country, including observations of seasons, tides and the moon, is important for identifying appropriate hunting, planting and cropping times. The dominant sentiment from interviews with Elders conducted by McNamara *et al.* (2010a) on Erub Island was that traditional knowledge about seasons, climate and how to sustainably manage environments was important and necessary for the sustainability of livelihoods and communities.

“All island laws, when 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 animals were here, there was no drought relief, there wasn’t anything to protect the species like endangered species. We know the language but for them kind of things; 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, whatever it is you call it... Because you know fish they eat them thing only when they fat, but when they not fat, they move to the next thing. That’s when they’re tastier. When they lose their seasonal fat, you don’t touch ‘em anymore now. You go to the next thing, proceeds around the circle. If you have that one thing all the time, you either stupid or them thing going to disappear.” (Erub Island Elder, pers. comm., 2009)

MTSRF-funded researchers worked with Erub Island Elders to synthesise some of their traditional ecological knowledge (McNamara *et al.* 2010b), including details about the migration and nesting patterns of the main totem birds, the movement of the Tagai star constellation, and the timing of onset of wind patterns indicating certain planting or fishing cycles. To try to assist in the important process of transferring this knowledge to the younger generation, the resultant seasonal calendar (Figure 1) was rendered in mural form at the local primary school. The school children were involved in the creation and installation of the mural, and its contents now form part of their teaching curriculum (McNamara *et al.* 2010b).

Islanders’ ability to identify indicators and ‘read’ their land and sea country is important in maintaining culture, livelihoods and their surrounding environment, and hence community resilience to change. McNamara *et al.* (2010c) noted that while traditional ecological knowledge has been established through generations, it is still continually being built upon, added to and reconstituted. Documenting, safeguarding and transferring this knowledge should help to improve the sustainability and resilience of Torres Strait communities to environmental change, both now and in the future. The Torres Strait Regional Authority is supporting Torres Strait communities in their efforts to record and manage traditional ecological knowledge, and to this end has recently secured funding through the Australian Government’s *Caring for our Country* program for a three-year project to design, establish and implement a traditional ecological knowledge system for the Torres Strait region (M. Isherwood pers. comm.).

⁴ <http://www.smh.com.au/opinion/politics/indigenous-experience-can-help-with-climate-action-20101013-16itw.html>

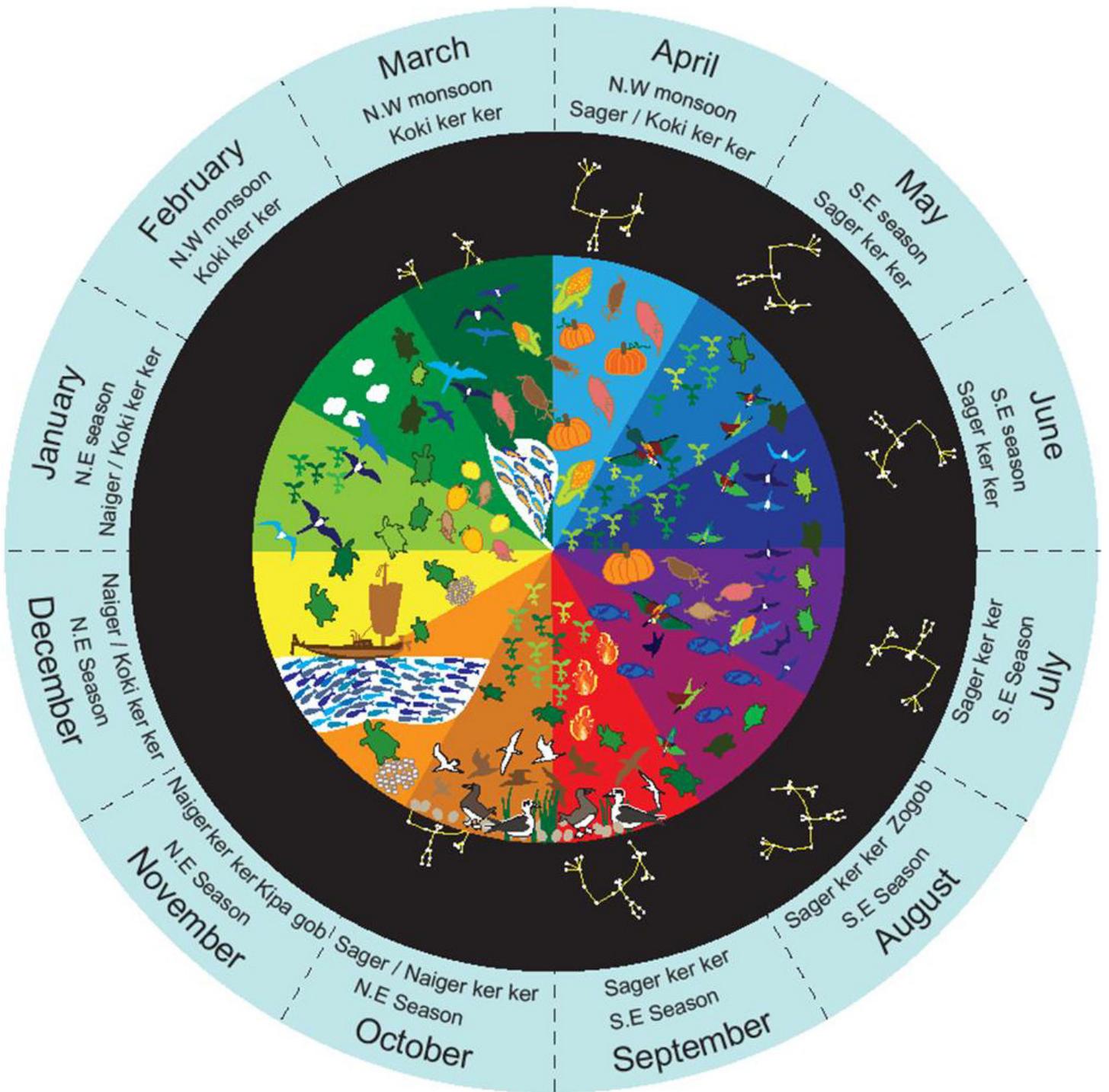


Figure 1: The seasonal calendar map for Erub Island, and (right) the mural installed on the external wall of the Erub Island primary school (McNamara *et al.* 2010b).



PHOTOGRAPH: EMMA DAVIDSON

Torres Strait Islanders' observations of recent environmental change

In recent times Islanders are experiencing greater difficulty in 'reading' their landscapes, including seasons and animal, sea and plant life, resulting in a form of distress that has been termed 'solastalgia' (Albrecht *et al.* 2007; McNamara *et al.* 2010c). For Islanders, the health of their land and sea country is related to their mental and physical wellbeing as well as the maintenance of their cultural heritage and practices (McNamara *et al.* 2010c). One Erub Island Aunty interviewed by McNamara *et al.* (2010c) expressed sadness that the solace and self-identity that she gained from her natural environment, especially her sea country, was diminishing as her land and sea country changed.

"Used to [read landscapes]. But now it changes, you have to guess now. Everything changes, make it so hard. Even old people they sat and talk, every time we sat, they my people. Like for the wind, 'Sager now right, or still koki?' You never know, it just change like that. Even the tide, the tide was so short. Things go so fast then it's coming short, you can't tell whether it's here long. Like before, you can know what's gonna happen. So hard now, sort of guessing now all the time, right, left. Right come through here, 2000 is sort of getting worse. I think it start changing in the 1980s, the changes start... Even the tide, even the season. Sometime you always know, like August, September you know, differences, all the leaves start to fall off. Then sometimes it come early like now, the leaves are changed. All my place is all just, I don't know whether from the wind though. Usually changes are going for the summer time, things start to change, but now everything sort of go so fast... Sometimes sad at home, think about the good old days. We always talk about the good old days. Now everything is so, even the trees, you can see changes in them, too. Even the fruits, like before, when the mangoes are like, we haven't had mango season. The leaves have turned down they start to grow flowers and then their fruit, all that's before this, when they fruit the finish they go next. Like you can eat mango until December the next year, but now, as soon as they get their fruit they fall off and finish. We now wait for our next season to come. This year is different, we still got mangos on the trees, something to do with the season, it sort of changes a lot." (Erub Island Aunty, pers. comm., 2010)

While there is local awareness of natural variability in the local climate/environment system, Green *et al.* (2010) reported some specific examples of unusual environmental indicators and weather patterns mentioned by a Poruma Island Elder, including delays to onset of specific winds and the rainy season, reductions or reversals in fatness of captured turtles and fish in August/November, delays in fruiting, changes in mackerel spawning patterns and crayfish growth rates. A specific recent example of an environmental phenomenon previously unknown in the Torres Strait was the soft coral bleaching event observed between Horn and Thursday islands, and possibly further afield in the Torres Strait, as reported in the *Torres News* on 8 May 2010⁵, and which was likely to be related to unusually high water temperatures.

"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 any, and there are some shells that they always tell us about, like that used to be on our home reef here but they don't find it any more... It's called the spider shells, yeah, or tumyuk shells, it's like an axe shaped shell, yeah, and they, when I do hear the Elders talk about it now and they, when they go up to the reef in the big low tides, they hardly see these shells any more, and for some reason, I don't know whether if it's due to high tides, so but I don't know if that's had an effect on the shells as well, but there are a lot of things and a lot of changes happening, but, we are looking at ways now, trying to, maintain what we have

⁵ http://www.torresnews.com.au/index.php?option=com_content&view=article&id=1442:global-warning-hits-our-backyard&catid=3:news

still, but strong cultural belief also we learnt from Elders is to look after one another.” (Young Erub Islander, pers. comm., 2009)

Traditional knowledge facilitating adaptation

Traditional knowledge is a valuable asset in observing and managing environmental change, and Torres Strait Islanders are no exception: they have used traditional knowledge to adapt to biophysical changes in their environment for centuries (McNamara *et al.* 2010c). For example, paleoclimatic studies have revealed that modern cyclone activity levels in Torres Strait (since 1800) are relatively low compared to the period 1400-1800 (Nott and Hayne, 2001; Nott *et al.* 2007). Traditional knowledge clearly facilitated the continued occupation of Torres Strait islands during that period despite the increased frequency of extreme weather events. While the ways in which Indigenous people have historically adapted to environmental change can be used to assist in planning for future culturally-appropriate adaptation strategies, change is now occurring at unprecedented rates (McNamara *et al.* 2010c).

“The winds are actually going on much longer into December or November, strong, and the erosion is, you can really see the difference, the island has gone back to where the people live and the actual sea level will rise where there was only inland. Now, the last time with the seawater was running down the main street on Erub and that's unheard of in our ancestor time... That didn't happen before. So, we knew now that scientist are definitely telling the truth, there's a rise in the sea level, because we see the changes. The whole world of cay and the islands are sinking themselves, too much the rise in the level. That's going to make a lot of difference in a lot of islands in the Pacific and some of them are disappearing now.” (Erub Island Elder, pers. comm., 2009)

Historical and contemporary adaptations to environmental change by Torres Strait Islanders on Erub Island recorded by McNamara *et al.* (2010a,c) included shifting resource bases, the use of local materials to construct rock walls, wind breaks and houses, revegetation to combat erosion, changes to traditional planting and cropping times, maintenance and use of fish traps and gardens, development of social capital (especially women working together), reading and respecting landscapes, and transferring knowledge. These observations are a mix of “hard” adaptation measures (such as using local materials to withstand extreme weather events, and revegetation) and “soft” or more indirect adaptation measures which create or improve community resilience and self-sufficiency (such as maintaining fish traps and gardens, and building social networks) (McNamara *et al.* 2010a).

“Hard” adaptation measures

Beach or shoreline erosion is at the forefront of concern for many Torres Strait Islanders (Green *et al.* 2010). McNamara *et al.* (2010) reported that people on Erub Island spoke of the need to use strong locally-sourced materials and the traditional knowledge of Elders and Aunties to reduce the impacts of strong winds and increasing tides on beaches and beachfront properties. A number of Elders and Aunties on Erub Island have used traditional knowledge to minimise the movement of sand or reduce the impacts of strong winds on their properties (McNamara *et al.* 2010a). Another Elder compared the effectiveness of traditional and modern methods of building seawalls, noting that while modern-built seawalls “last forever”, they were expensive and required equipment and materials not available on the island (McNamara *et al.* 2010a). In fact Elders noted that reliance on modern ways of doing things, rather than traditional knowledge, seemed to be actually decreasing the community's resilience to environmental change in some ways (McNamara *et al.* 2010a), specifically the cessation of traditional practices that were thought to replenish sand on beaches, and a shift towards building “white man houses” rather than traditional, less permanent dwellings made from locally-sourced materials. An Elder from Mer Island is quoted in Green's unpublished

notes describing how traditional habitation patterns changed when the missionaries arrived in the 1800s, because “they got everyone to live along the beachfront where they built the church and government residence ...” McNamara *et al.* (2010a) reported one Erub Island Elder describing how local materials were used much more frequently in construction in the past:

“When I was a young boy they used to use bamboo wall as a wind break from one to two metres, differing height with gaps in wall to get beach access. This was out front of church, on beach ridge. At this time people live in grass house, used palm leaves but when people build white man house, some people they think they don’t need bamboo for stop the wind. Then use shade cloth to stop the wind or tarpaulin, go to shop get it, not bamboo – not everyone, some. Sometimes ago we didn’t have money like now so would use bamboo. Bamboo makes all sorts of things – floor, bench, house roofs. I can only go to my area to get the bamboo – my grandfathers left the bamboo for us on our land – I can’t go onto somebody else’s land and get the bamboo.” (Erub Island Elder, pers. comm., 2009)

Coastal revegetation programs aiming to decrease the risk of erosion and inundation have been undertaken in many countries worldwide, and can secondarily help to improve food security and livelihoods in the long term through restoration of habitats for fish, crustaceans and birdlife (International Institute for Sustainable Development, 2003). Traditional ecological knowledge has contributed to an increasing local perception of the usefulness of revegetation in encouraging sand accretion rather than erosion on Erub Island and surrounding cays (McNamara *et al.* 2010a). McNamara *et al.* (2010a) described a specific community-driven revegetation project using three types of native grasses that aimed to stabilise and increase the volume of sand being accreted at East Sand Cay, near Erub Island. Interviewees considered further significant actions to repair mangroves, sand cays and other riparian vegetation important to minimising the impacts of extreme weather events on their community (McNamara *et al.* 2010a).

“The island couldn’t have come from nothing to something if there it didn’t have any a natural, a natural mechanism or whatever in place, there for them to rise out of the depths of the sea to come there. And what grass grow there will continue to make it come up. So my advice is development is a good modern thing but before any engineers or anything, anybody start making plans to put big project in place that’s going to disturb the natural shape of the island or thing, should really do more study, should link the study with local knowledge, not the engineering knowledge from sitting in some big, technology, tech office in Brisbane or Sydney and draw up, ‘you-beaut’ plans.” (Erub Island Elder, pers. comm., 2009)

“Soft” adaptation measures

Soft adaptation measures based on restoration of traditional methods and systems are thought to be reflective of the community’s desire to increase the capacity of the community to cope with future changes in local conditions (Osman-Elasha *et al.* 2006). More indirect adaptation strategies used in Torres Strait – such as rebuilding and maintaining traditional fish traps, and revitalising traditional methods of gardening – build social resilience to change by improving health, creating further food security, encouraging a sense of community, and providing a space to discuss changes and potential approaches to adapting to further changes (McNamara *et al.* 2010a).

Restoration of traditional respect for land and sea country was viewed by many Elders and Aunties as fundamental to building community sustainability and resilience (McNamara *et al.* 2010a). One Erub Island Elder interviewed by McNamara *et al.* (2010a) made a strong point about building community resilience by becoming less reliant on technology, restoring traditional and more sustainable food harvesting practices such as the centuries-old intertidal

fish traps. Others described the loss of traditional gardening practices observed during their lifetimes, and expressed a desire for these practices to be renewed for the benefit and health of 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. When we grew up, we grew up with that.” (Erub Island Elder, pers. comm., 2010)

Hunting of turtle and dugong is of enormous cultural importance in Torres Strait and also provides a significant local source of protein. Both the ability to hunt and the relatively ready availability of protein could therefore be considered important components of community resilience in the region. Restoration of traditional practices would be likely to improve the sustainability of hunting, particularly of species of conservation concern such as turtle and dugong. One Elder interviewed by McNamara *et al.* (2010a) appeared frustrated with how current turtle and dugong catch occurs with little regard for following traditional hunting protocols and respect for ecosystem balance:

“Turtle time. Turtle the same as everything. 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... These young people here now they go and grab anyone. They don’t follow the time like that like I mentioned in seasons before the mating time... Dugong and turtle is our fresh meat. We go and get bush tucker. It’s like market, you go, you buy your goods there and then you got to butcher to get your meat. Out in the seas like a butcher to us. We got fish, turtle and dugong, crayfish and then we go up in the garden and get all other stuff. That’s how our life been, we live from the sea and from the land, you know... all different variety but we know which is which. We learn from the older people. Care for them too, not too greedy on it, just take enough... Before we go out get one or two turtle come in here, butcher ‘em up. The whole community will share them. Not like today. They got outboard. They go out outboard and the deep freezer, they stock the freezer and when they can’t finish it, they throw it away. That’s wasting, you know; that’s why we don’t get much... People go out and get dugong today because they are so greedy because everything easy. They got outboard dingy, they run around and get one and want to get another one. They found it easy.” (Erub Island Elder, pers. comm., 2010)

Robust social networks can form an essential component to build a community’s adaptive capacity (Ford *et al.* 2006; Tompkins *et al.* 2004; IUCN, 2008). McNamara *et al.* (2010a) described a new women’s group on Erub Island that is strengthening social networks and building capacity in the community to adapt to change.

“It’s important that younger women that have kids and that to know what it’s all about, to learn to crochet, nowadays you don’t do that, our parents do it, weaving, that’s the main thing, gardening, you know. We don’t have it any more. Why? Because we have got shop and it comes from down south. You have to go and buy it, you know. Be the best to do your own gardening and that.” (Erub Island Aunty, pers. comm., 2009)

Conclusion

Despite a common international perception that Indigenous peoples tend to be particularly vulnerable to climate change (e.g. IPCC Fourth Assessment Report⁶; Green *et al.* 2009), there is increasing evidence that traditional communities such as those in the Torres Strait possess the tools to be quite resilient to environmental change. The MTSRF-funded research summarised in this report has helped highlight some of the ways in which traditional ecological knowledge and practices increase the sustainability of community life in the Torres Strait, and hence community resilience to environmental change, including climate change.

Some of the most striking evidence for the connection between traditional ecological knowledge and practices and community resilience in the Torres Strait arises from anecdotal observations of how adoption of “modern” methods has reduced the sustainability of lifestyles and community capacity to adapt to change. Specific examples include:

- Changes to traditional ways of locating and constructing houses that renders them more vulnerable to tidal inundation and more expensive to rebuild and repair;
- Abandonment of traditional fishing, hunting and gardening practices, which decreases sustainability of environmental management and decreases food security because of increased reliance on external food sources; and
- Failure to transfer traditional knowledge about environment or sustainability to younger generations.

In short, communities that value traditional ecological knowledge and practices are likely to be more sustainable and resilient than communities that have lost this knowledge. McNamara *et al.* (2010a,b,c) described several cases in which traditional knowledge is already facilitating both hard and soft adaptation to climate change on Erub Island, including:

- Re-vegetation of sand cays, mangroves and foredunes;
- Use of locally-sourced, sustainable materials in construction of houses, rock walls and wind breaks;
- Rebuilding of social networks, particularly amongst women; and
- Commitment from Elders to transferring knowledge, and evidence that young people are willing to embrace that knowledge.

While outsiders (policy makers, government officials and the public) may see the communities of the Torres Strait as being particularly vulnerable to changing environments, this MTSRF-funded work has highlighted the role that traditional ecological knowledge and practices is playing and should continue to play in increasing the resilience of Torres Strait communities to climate change. Future adaptation planning in the region should seek to understand and build on the traditional mechanisms already operating in the Torres Strait, thereby increasing the chances of successful adaptation to environmental change, including climate change.

“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. Not only, we don't want someone sitting in Brisbane in some air-conditioned office deciding what is for Erub. We must have a balance.” (Erub Island Elder, pers. comm., 2009)

⁶ <http://www.ipcc.ch/ipccreports/ar4-wg1.htm>

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