Resilience in Knowledge: Unpacking Adaptation Strategies on Erub Island, Torres Strait

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Supported by the Australian Government's
Marine and Tropical Sciences Research Facility

Project 1.3.1 Traditional knowledge systems and climate change in Torres Strait
Objective (e) Report on resilience and adaptation strategies to climate change
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This report should be cited as:

McNamara, K., Westoby, R. and Parnell, K. (2010) *Resilience in Knowledge: Unpacking Adaptation Strategies on Erub Island, Torres Strait.* Final Project Report to the Marine and Tropical Sciences Research Facility. Published online by the Reef and Rainforest Research Centre Limited, Cairns (46pp.).

Related Articles:

McNamara, K., Westoby, R. and Parnell, K. (2010) *Elders' and Aunties' Experiences of Climate on Erub Island, Torres Strait.* Final Project Report to the Marine and Tropical Sciences Research Facility. Published online by the Reef and Rainforest Research Centre Limited, Cairns (24pp.).

McNamara, K., Sibtain, J. and Parnell, K. (2010) *Documenting and Sharing the Seasonal Calendar for Erub Island, Torres Strait*. Final Project Report to the Marine and Tropical Sciences Research Facility. Published online by the Reef and Rainforest Research Centre Limited, Cairns (20pp.).

Published by the Reef and Rainforest Research Centre on behalf of the Australian Government's Marine and Tropical Sciences Research Facility.

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Reef & Rainforest RESEARCH CENTRE

30 June 2010

Executive Summary

Torres Strait Islanders have long been managing their land and sea country. In this vein, they have also been adapting to changes in their local environments since time immoral. Researchers funded by MTSRF Project 1.3.1 'Traditional knowledge systems and climate change in Torres Strait' have attempted to chart Islanders' actions or activities, adopted in the past and present, to adapt to environmental changes by working with community Elders and Aunties on Erub Island, located in the eastern group of islands of Torres Strait. The project team also worked with some younger Islanders to ensure their collective voice was also heard on the future management of Erub Island. As such, those views are also documented in this report.

This report examines and synthesises knowledge from Elders and Aunties of Erub Island, as well as the voice and views of young Islanders. Such knowledge includes the actions and activities that have been employed in the past and present to adapt to environmental changes, including climate and seasonal changes. This information can shed light on Erub Islanders' ways of adapting to changes in the future. The aim of this research was to identify the adaptation strategies (actions and/or activities) that Islanders themselves believe are appropriate for their community, drawing on past and present knowledge. Our role, as the research team, was to document and synthesise beliefs and knowledge, which exist in the pages that follow of this report. Key themes of adaptation that have emerged from the Elders, Aunties and young Islanders include the utilisation of local materials for rock walls, wind breaks and houses; revegetation of areas to combat erosion; reestablishment of fish traps and gardening; the development of social capital, especially women working together; reignition of reading and respecting landscapes; and capacity to transfer knowledge.

In reflecting on these adaptation strategies, this report makes comment on the social resilience of Erub Island as a community. In other words, and given the knowledge about adaptation strategies, the overall ability of communities to cope with change and disruption. It is hoped that the findings of this research can be used as a toolkit by those responsible for planning for future generations to further increase the adaptive capacity and overall resilience of the Erub Island community.

Contents

List of Figures

Acronyms Used In This Report

ABC..... Australian Broadcasting Commission
ABS..... Australian Bureau of Statistics
CRS..... Catholic Relief Services
JCU ..... James Cook University
MTSRF..... Marine and Tropical Sciences Research Facility
NE ..... Northeast
NW ..... Northwest
SE..... Southeast
SW..... Southwest
TSRA..... Torres Strait Regional Authority
UNEP ..... United Nations Environment Programme
UNESCO..... United Nations Educational, Scientific and Cultural Organization

Acknowledgements

Thanks to Damien Miley, Vic McGrath, Fiona Morseau, David Hanslow and Jim Monaghan from the Torres Strait Regional Authority (TSRA) for their guidance and assistance with this project.

Many thanks to John McNamara and Jonathan Sibtain for their assistance on field trips to Erub Island.

And finally, many thanks and gratitude to the Elders, Aunties and young Islanders who gave their time and insights. It was a privilege working with you all and we hope that we have done justice to representing your views and voice in this report.

1. Introduction

This report is one of a series presented by James Cook University on communities living in the Torres Strait. The series is part of a research project conducted under the Australian Government's Marine and Tropical Sciences Research Facility (MTSRF) program. The research described here fits within the MTSRF objective to 'report on resilience and adaptation strategies to climate change' – Objective (e) of Project 1.3.1 'Traditional knowledge systems and climate change in Torres Strait'.

Under the MTSRF program, the project outputs presented in this report is considered 'public good' research that is end-user and stakeholder driven. Stakeholders in this research project include, (i) the Torres Strait Regional Authority (TSRA); (ii) Island Councillors and Island Managers; (iii) Prescribed Body Corporate; and (iv) Elders and locals living in these communities.

The Torres Strait consists of a group of over one hundred islands that spread beyond 48,000 square kilometres (see http://www.tsra.gov.au). 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. Approximately 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 Australia (ABS, 2006).

As a starting point, this project was envisioned as representing Torres Strait community knowledge as an asset in environmental knowledge and management. In other words, rather than representing Torres Strait Islanders as 'victims' of climate change, this project envisioned them as active 'agents'. That is, as a resilient community with valuable environmental knowledge. It is anticipated that this report, and overall findings of the research, will be useful to the above-mentioned stakeholders 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 knowledge within the broader community.

Environmental change is not a new phenomenon. Consequently, communities have been adapting to changes in their local environment for centuries. Torres Strait Islanders are no exception. This reports documents traditional practices of adaptation to change by examining how past and present adaptation strategies have been employed on Erub Island in the Torres Strait. 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: v) define 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 project seeks to document these adaptation 'actions or activities' (strategies) from the past and present. The ways in which Islander people have adapted to these situations in the past are important, as this in turn assists in planning for future culturally-appropriate adaptation strategies.

The findings presented in this report are based solely on the ideas, beliefs and knowledge of Elders, Aunties and young Islanders. This report does not weigh up the merit of various science-based or technical-based adaptation strategies, but rather it relies on in-situ fieldwork that involved in-depth interviews with those community members. In this way, it is

the Islanders themselves who outline the strategies that they believe to be most appropriate for their community, based on their past and present knowledge. The role of the JCU research team was to record, collate and bring this knowledge together, as illustrated by this report.

A number of stories from Erub Island are presented throughout this report, each demonstrating local adaptation mechanisms and overall community resilience to climate change impacts. This project also considers the interrelatedness of adaptation strategies and social resilience. Social resilience in the context of this project refers to the overall ability of communities to cope with external disturbances due to environmental change (Adger, 2000), whereas adaptation strategies recognise the actions taken to minimise these disturbances. By understanding the types of actions and activities taken to adapt to changes in the past and present, preliminary observations can be made about the overall social resilience of the community, including their ability to cope with further future environmental stresses.

The findings of this research can be used as a guide for those responsible for planning for future generations of Erub Island people and building resilient communities as they learn to better address climate change issues in their everyday activities. It is hoped that further discussion about these climate change issues will lead to a better understanding of them, including the adaptive capacity and resilience of communities, as they affect other places throughout the world.

This research builds on other contemporary projects that have highlighted the adaptive capabilities and social resilience of Indigenous communities in the face of changing landscapes and changing natural environments. Climate Frontlines, an initiative of the UNESCO, has numerous projects that highlight strong adaptive capabilities in the small island nations of the Pacific, Southeast Asian countries and individual communities in countries across Africa.

In the Fijian islands, communities have become aware of sharing valuable knowledge that details resilience mechanisms from past extreme weather events. This sharing of knowledge can be 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 Elder’s accounts, this knowledge has provided valuable adaptive potential for future planning with respect to the likelihood of increased extreme weather events in the future (UNESCO, 2009).

With similar tenants to this project, Ford *et al.* (2006) conducted research with a focus on vulnerability and climate change in Arctic communities. Using comparable participatory methodologies, the study documented the strong social resilience and adaptability of Inuit communities. This was borne out of strong traditional Inuit knowledge, robust social networks, flexibility in hunting cycles, and adoption of some modern technologies (Ford *et al.* 2006).

These examples highlight the importance and value of this research for the Torres Strait. It also points to the potential that this, and future endeavours in incorporating local and context-specific knowledge into climate adaptation strategies, has in developing culturally-appropriate, sensitive, and strength and asset-based approaches. Such an approach should not be underestimated. Local community should drive decisions about adaptation strategies, and draw on local resources and knowledge in order to promote the ownership of locally-appropriate responses. This recognises that people in local settings are key resources not to be overlooked; instead, they should be the focus (Carney, 2002).

This report focuses on the documentation, synthesis and analysis of knowledge from Elders and Aunties on Erub Island. This knowledge was obtained through seventeen in-depth,

unstructured interviews held on the island in November 2009 and May 2010. Through this synthesis of knowledge, it is hoped that adaptation strategies used in the past, as well as present, might assist in developing future capacity. That is, reducing overall exposure to the direct impacts of climate change such as increased average temperatures, changes in rainfall, extreme weather events and slow onset sea level rise. Likewise, it is also projected that knowledge of adaptation strategies may lessen the indirect impacts of climate change that can affect food security and gardening; water and energy security; bio-security; biodiversity; health; fisheries; planning and development; transport and communications infrastructure; and culture and livelihoods.

This report also seeks to provide an avenue for better understanding traditional practices of adaptation to environmental change, particularly changes in climate and seasons. For Torres Strait Islanders, the connections between land, sea, environment and culture are paramount to their identity, livelihoods and sustainability. Thus this project goes some way to ensuring that knowledge about adaptation is both safeguarded and facilitates culturally-appropriate adaptation to contemporary climate change and decision-making about Islanders' futures.

2. Methodology

This section outlines the research methodology adopted for this project and in particular this project objective on adaptation and resilience. This report documents stories and knowledge of past and present adaptation strategies and overall community resilience on Erub Island in the Torres Strait.

The overarching objective of this project was to safeguard and synthesise environmental knowledge in relation to climate change. The specific aim of this project component was to better understand the adaptation strategies used in the past and present to minimise external environmental disturbances. With this aim, it is anticipated that those responsible for the future planning of Erub Island can integrate knowledge from Elders and Aunties about adapting to changes in everyday life.

A number of project phases were adopted to better understand the types of actions employed in the past and present by Islanders to adapt to environmental changes. The primary method adopted was in-depth, unstructured interviews. Qualitative methods were deemed most appropriate and effective for this project, particularly in that qualitative methods are flexible in giving voice and leverage to those who may otherwise be silenced (Winchester, 2005). Conduct of interviews is also an important primary methodology for capturing multiple meanings, and interpretations of a range of opinions, memories and experiences (Pile, 1992; Winchester, 2005). The in-depth interviews conducted for this project were predominately open-ended in character and more conversation-like, making them more unstructured in delivery (Rice and Ezzy, 1999; May, 1993). While these interviews were conversation-like, the interview remained controlled and geared towards the interviewees' research interests and research process (Minichiello *et al.* 1995).

The objectives of this project were devised in collaboration with a number of key stakeholders, for example the Torres Strait Regional Authority (TSRA), Island Councillors and Island Managers to ensure the relevance of the research. Stakeholders such as these helped provide:

- Project guidance and direction;
- Insights into how to collect traditional environmental knowledge;
- Advice on how to safeguard community knowledge; and
- Advice on how to usefully and appropriately apply the project findings.

The findings of the research will be useful to stakeholders explicitly addressing climate change issues in the everyday activities of Erub Islanders.

The methods, as mentioned above, were used over the course of the three phases of this project component, outlined in detail below.

Phase 1: Reconnaissance trip

Phase 1 was conducted on the first trip to Erub Island on 7-11 September 2009. This reconnaissance trip was useful in developing initial relationships with Elders, Aunties and local community members. The anticipated life of the project was twelve months and thus developing trust and rapport with community members needed to happen quite early on in the project. One of the community liaison officers in the Land and Sea Management Unit of the Torres Strait Regional Authority (TSRA) accompanied the James Cook University (JCU) research team on this trip and provided initial introductions with the Council Manager,

community forum committee members and community Elders. Initial discussions were held with Elders about the project, including their preliminary experiences of climate and seasonal changes and knowledge of adaptation strategies.

Prior to the first trip to Erub Island, ethical clearance was granted from the JCU Human Research Ethics Committee. The granting of ethical clearance is a comprehensive and rigorous process. As part of the Aboriginal and Torres Strait Islander Human Ethics application form, project background, significance and aims were all adequately addressed. Of particular interest was the detail and consideration that needed to be invested into the values of the research. Questions of reciprocity, respect, equality, responsibility, survival and protection, spirit and integrity were all addressed in the application. The JCU team worked hard to ensure that the research would be carried out in a respectful, beneficial and ethically sound manner (see Louis (2007) for an in-depth discussion of Indigenous research methodologies).

Phase 2: Major interviewing trip

Phase 2 was carried out during the second trip to Erub Island from 25 November to 4 December 2009. On this trip, a number of in-depth interviews were conducted by one co-author with community Elders, Aunties and younger locals. These Elders represented the four clan groups on Erub Island – Samsep Serar, Meuram Beuger, Perudu Waumer and Saisarem Karr. The knowledge ascertained from these Elders and Aunties, specific to Erub Island, included a variety of adaptation actions including replanting, past self-sufficient harvesting, and stone walls and wind breaks – discussed in detail in Chapter 3.

The interviews conducted were in-depth and semi-structured in format. A series of theme-based questions were assembled prior to the interviews and referred to during the interviews. Dabbling in themes of adaptation, fisheries and horticulture, culture and heritage, and visions for the future, the following questions provide an example of questions asked:

- What past actions have you taken to cope with environmental change?
- What present strategies are you using to cope with environmental change?
- What adaptation measures will be required to cope with the most recent changes?
- Does the community have its own self-sustaining system of agricultural production / community gardens? If so, what are the main crops? And if not, why is this the case and has there been in the past?
- Has there been any relocation of crop sites due to climate change impacts? If so, what are the details of this?
- Are you involved in commercial or traditional fishing practices? Has your involvement changed over the years? If so, how?
- What are the main impacts of changes in climate / weather on cultural heritage sites?
- Has there been any disturbance to infrastructure / settlement as a result of environmental change?
- What are your views on achieving locally-appropriate environmental management?
- What assistance would be most useful from state sources to cope with environmental change?

Questions were asked in whichever order was necessary in order to maintain the flow of conversation throughout the interview. The length of interviews ranged from twenty minutes to two hours. One interview with an Elder was completed on sea country to demonstrate changes and indicators on country. All interviews were digitally recorded with the exception

of two. In the latter case, we asked the participants to write down their story and knowledge on paper. Referring to Dunn's list of informant rights (Dunn, 2005); all interviewees were asked for consent to use the recorder during the course of the interview. Interviewees were also made aware that if they did consent to its use that it could be paused at any stage and that they could also discontinue the interview at any stage.

As with all phases and island visits, an informative poster about the project and team members was compiled and sent to Erub Island Council prior to our visit. Staff of the TSRA Land and Sea Management Unit provided feedback and assistance with the poster. The poster provided the local community with information about the project such as intended visit dates, photos of each team member, the project length, outcomes and community benefits. For example, the poster outlined the benefits of the project in the following way:

> 'Overall, the project and the team affirm the importance of oral traditions within the community, and value their traditional environmental knowledge. The project team would like to confirm that ownership of this knowledge will remain with the Traditional Owners.'

To further provide information and awareness to the community about this project, the project team was each individually interviewed on the local radio station. In both Phases 2 and 3, members of the team spoke to the local radio station on Erub Island and provided details of the project, including aims, community participation, outcomes and benefits.

Phase 3: Follow-up interviews

Phase 3 included the third fieldtrip to Erub Island on 17-21 May 2010. This trip was important as it allowed further time to be spent on the island with Elders and Aunties and revisit questions where gaps remained. Prior to this trip, all interviews from Phase 2 had been transcribed and reviewed, allowing the identification of knowledge gaps. A number of follow-up interviews were conducted with Elders and Aunties, as well as three new interviews (with one Elder and two Aunties) that were missed during the major interviewing phase in November 2009.

In total, 17 interviews were conducted over the three fieldtrips to Erub Island. Eight of these interviews were held with the Island's Elders and five were conducted with respected Aunties. Four interviews were also held with younger community members to capture the younger island voices, particularly in relation to their views on traditional knowledge, visions for the future of Erub, knowledge that has been passed down to them, and how this knowledge may influence their everyday life.

3. Results and Discussion: Stories of Resilience and Adaptation

Based on the interviews conducted on Erub Island, this chapter provides in-depth detail of various adaptation actions and/or activities. The following quotes from Elders, Aunties and younger members of the Erub Island community are designed to illustrate the past adaptation capacities of communities and highlight the future approaches that the community could seek to capitalise on. While each of the groupings of approaches may initially be perceived as not relating to the issue of adaptation, they are in fact clear adaptation actions and/or activities. These groupings include rock walls and wind breaks; revegetation; fish traps and gardens; the role of women working together; reading and respecting landscapes; and transferring knowledge.

Utilising local materials to withstand extreme weather events is a 'hard' tangible adaptation measure, likewise revegetation and planting to combat erosion is another 'hard' measure. Softer or more indirect adaptation measures, such as maintaining fish traps and creating gardens, and building social networks such as women's organisations are engineered to create community resilience and greater self-sufficiency. Each of the six groupings will now be detailed. An initial explanation of their relevance to adaptation and social resilience will be provided, followed by an exploration of the views and knowledge of Elders, Aunties and young Islanders.

3.1 Local materials for rock walls, wind breaks and housing

The musings of Elders, Aunties and youth in the following section illustrate that there is a strong commitment to use local materials to build rock walls, windbreaks and houses. People spoke of the need to use strong materials that are locally sourced, as well as revitalizing the knowledge of Elders and Aunties to reduce the impacts of strong winds and increasing tides. Utilising this local knowledge and sourcing local natural materials enables communities to build resilience and rely less on resources from mainland Australia. Building capabilities for adaptation to change based on 'local' fosters a sense of ownership and control over adaptation measures (Korten, 1990). As outlined throughout this section, a number of Elders and Aunties on Erub Island have taken measures on their properties to minimise the movement of sand or reduce the impacts of strong winds.

One Elder has been using local materials to minimise the impacts of strong winds and retain the sand on his beachfront property. The following interview excerpt explains his reasoning for building a rock wall/groin on one side of his property:

> 'I tell you what, why I been build that thing when I first come back here and I see the big tide come up, and the bits that build up, and every time the waves come through, they roll, roll, roll round the point here. When the tide [goes] down I can see all the sand go round the back here. That harbour down there, it was deep in our time. The lugger boats will anchor right alongside there. Where the entrance towards the ramp now, but now you go there low tide, you can walk out where the boat was anchored because all the sand from the beach they go through here and fill the harbour up. The first thing I did when I […] came back here, they gonna dig the ramp and they want to find a place to stockpile all the material. So, I asked them to fill the area here where the medical centre now. Help stop the sand from go through. I see the sand keep moving around, so I build this little thing up in the front here… A lot of the sand come back. They stop here now [because] one big rain come down, the creek in the middle of these two village here got flooded out and took all the sand out there and every time sand come

> from far village fill this village up, when the creek flooded up pushed all the sand out there and the tide pick up the sand and took it right down to the harbour. That's my experience or whatever, that's what in my mind, I reckon I'm dead right because when I do this thing here, stop the sand and that beach started to grow backward. When they flooded out, took the sand out, they come up here. When the monsoon come back the tide come round there and take the sand back again… The stonewall was to stop the sand from moving around to the pier there, keep sand here on beach and is working.' (Elder, pers. comm., 2010)

The Elder went on to say that when there is a high tide the sand then traps some of the water and inhibits it from coming up as high. Figure 1 shows the rock wall out the front and to the side of the Elders' property.

Figure 1: View of the rock wall described by an Erub Island Elder. Photo by Karen McNamara.

The same Elder had also placed a number of sandbags and crates and old tyres cut in half out the front of his property to work as barriers and to retain the sand against the receding tide:

> 'We put in sandbags and tyres out front so sand doesn't go out to sea – it works but have to keep doing it and we have crates there too, buried.' (Elder, pers. comm., 2010)

Figures 2 and 3 illustrate the crates, tyres and sandbags out the front of the Elders' property.

Figure 2: The use of crates, tyres and sandbags to protect a beachfront property on Erub Island. Photo by Karen McNamara.

Figure 3: View of the crates, tyres and sandbags used to protect property. Photo by Karen McNamara.

The Elder also spoke of other adaptation measures around the island, such as bamboo wind breaks.

> 'Well, [the bamboo is] only a windbreak. From the days of our grandfather time, they got old bamboo which [lasted] longer. If they put coconut leaves as a windbreak in the front, it's only going to last a year […] But, if you put bamboo there, it'll last a couple of years or more. It doesn't stop the water [though]; it's just a windbreak from blow the sand upward. See, when strong wind, the wind blow when the low tide, the sand get dried, the wind blow it upward. So, we got to attack two way, the water and the wind… Oh yeah. Another thing that bamboo wall stopping them drifting wood come. High tide and big drifting wood come up; it stuck on that bamboo wall. Don't come up and damage the sand more. See, when the big logs stuck on the beach and the wind come up and blow the sand away from there and then make a big hole in the front of the sand or sometime the sand buried that big log but only for time being. A big tide come, that log will come out again. When it come out again, you got big hole there. The waves come and roll in the hole and dig it all up.' (Elder, pers. comm., 2010)

He appeared positive when describing these adaptation strategies on his and other properties on the island. He attributed his positivity to the success of actions to minimise sand movement offshore and reduce the impacts of strong winds, thus allowing communities to continue living right on the coastal fringes of the island.

For another Elder interviewed, using natural and local materials for wind breaks was also effective in minimising erosion and other impacts on the island. He discussed the use of other expensive 'hard' options, such as seawalls, to reduce the sensitivity of island communities to the impacts of climate change:

> 'Well 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. On a much more expensive things but it lasts forever, you do a rock wall like the barge ramp here, the big boulders but they have to come from somewhere else, or you need to excavate the area where the harbour is. That's where all the rocks came from for this, from the digging of the harbour because there's hardly any big boulders on Darnley… Well, the traditional wall that I spoke about are the only technology that the natives had at the time. It is you guys that brought the machinery.' (Elder, pers. comm., 2009)

Figure 4 shows the beachfront of Erub Island in November 2009. Firstly, it illustrates the closeness of community settlement and infrastructure to the coastline. Secondly, it demonstrates the use of local materials for wind breaks.

Figure 4: Communities and infrastructure, including wind breaks, along the coastline of Erub Island. Photo by Karen McNamara.

In another practical example, an Aunty describes how the strong winds and high tides have been causing the movement of sand. Consequently, she has been forced to act and build a bamboo wind break along the front of her property right on the beach front, as she explained:

> 'So I decided to bring my family from PNG, six of them come to put them bamboos and that. 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, you know, and it won't come right up to the beach house… It is a wind break plus it will build up the sand. Yes, yes, round the back. We ask land owner if we can get some [bamboo]. He said, 'OK'. So we get the boys to go and get it from certain place, he wants to get them, you know. They have to soak it in the water for a few days, salt water, so it won't get rust easily, and then put it up… Just bamboo and with coconut leaves and that, all just, you know, put it to stop the wind as wind breaks.' (Aunty, pers. comm., 2009)

Figure 5 below shows a photo of the windbreak out the front of the Aunty's property.

Figure 5: The bamboo wind break constructed out the front of an Erub Island Aunty's property. Photo by Karen McNamara.

One Elder described how local materials on the island were used much more frequently in the past to create wind breaks on people's properties.

> 'More people on island, so Darnley getting smaller. 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.' (Elder, pers. comm., 2009)

In a similar fashion, one Aunty reflected on practices employed in the past to maintain sand nourishment on beach fronts:

> 'When we used to just throw the palm leaf and rubbish on the beach. When you throw rubbish, rake up your yard and destroy the things of the beach, the sand stay there but all the leaves and things go out with the tide. That's how them old people used to... I remember grandma used to say, 'When you rake up the yard throw them old things on the beach, build up the beach there so the sand won't go away all the time'. As the tide come, the tide like the banana leaves, but the sand's still there. We used to also use them floating logs. We used to put the logs down the beach there. Every time them big logs come, all of us go and push it down to the beach. When big tide come in, they sort of throw the sand over the log back to the beach. That's how they used to build a beach like that all the time.' (Aunty, pers. comm., 2010)

Another Elder discussed reforestation and the planting of native trees and fruit trees on the island. He also spoke about how foundations and materials used to build houses in the past could withstand extreme weather and climatic conditions:

> 'I think we can see, when we're talking about reforestation, we like to see all the native trees instead of, about the hard wood they used to use for the post, and for our children to know what sort of tree it is. And some of the fruit trees, where people used to really like them, some of them, I got a couple down in my place, what do you call, Suraby, it's like a wild fig… To me, the foundation of people that

> lives here in those houses, the structure, they are the one they should know. They survive; they came through waves, hail, or storm, whatever they had in the community. They always stay in the house by the structural side of what sort of posts they using. And they got their own name for it and easy now, you can have a look at it and said, even when you cut for firewood, they know what is the hard wood, make a good coal, or some of them that would give too much smoke, this sort of thing. They got special name on it. I thought the kids these days should know something to go back on the structural side of any houses that built here. Look, this is the main timber they use for building… There is certain tree that they usually cut it to build a house, or thatched roof, and we seem to be moving away from it now. People, there's special name for the hard wood, you can use it for the post, or rafters, this go right through even the bamboo, bamboo doesn't touch much anymore. I don't think, only on special occasion we like to go back to a cultural way of building something, we go and cut bamboo. And also there is type of grass, where people used to burn the grass every twelve months just to get it clean so they can cut it and use it on the roof of the house. It is one of the thing that, whether it is just us or whether it is globally, we seem to be moving away from it, and by maintaining the cultural life I think I believe it must. To show the communities, show our children, especially at the school.' (Elder, pers. comm., 2009)

This is an interesting point to make. While Erub Island is not a low-lying island, the majority of community infrastructure and houses have been built directly along the coast. In other words, where houses and infrastructure have been built, and the materials that have been used in more recent years, have the potential to cause greater sensitivity to further climate extremes and impacts.

Figure 6 illustrates how houses were made in the past from native grasses found on the island.

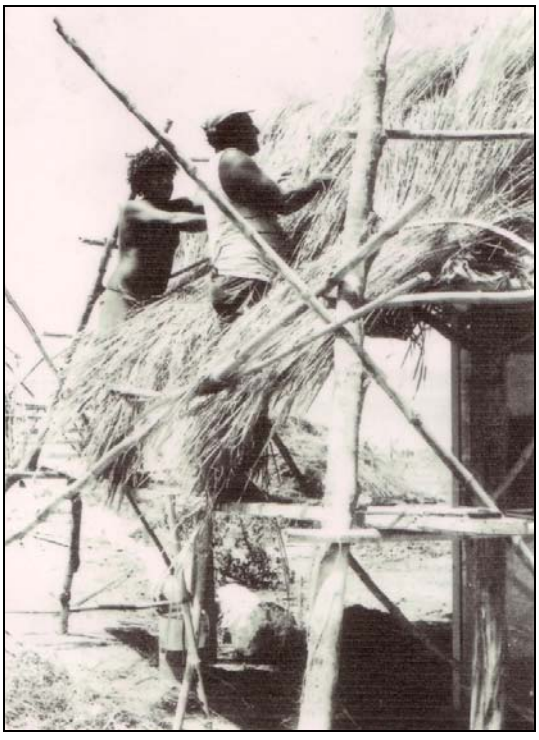

Figure 6: Erub Islanders building a traditional house using grass materials for the roof. Photo extracted from Erub Island Council Library records.

In an interview, an Elder described what we can see in Figure 8 from the early 1900s. He provided great detail on how the houses were made in the past and reflected on the use of bamboo and grasses as solid, local materials:

> 'Well they were made of all of our bushes we got special bushes round the back; we got big forest around here. All them rain forests, they get them from there, the bamboo. And the grass, special grass, not every grass the same, that's the same grass here you know, for instance, we have got a house grass, that's for house, and when you know, they go up, is standing on a big grass field and look, where there's a good spot, where all for us, you put your mark. If you put your mark, just make a note on the end of the grass, somebody come up to you and looks at you, somebody already take over this area, but everybody got their own land. You've got to go in there, and get the grass from it. Get a good grass then you have to ask the owner, 'can I get some grass for my house?' 'Oh yeah'. That's why he would get the grass from there, the bamboo from the back and the post. We cut them down, cut them down to bits, put them down the front, anywhere round the back here, all them logs, bamboo, tie them up in a post together, get them bush rope, they strong, we know which one. Tie them up together and when high tide he comes afternoon or night, you float all the way, walk and push them all the way, all the family, the next door neighbour, I got family together, we were, everyone, call all you, they come, we decide to build a house.' (Elder, pers. comm., 2010)

This section has presented a united voice from Elders and Aunties on the value of using local materials to build rock walls, wind breaks and houses. These materials were considered stronger and more effective to reduce both the impacts of strong winds and tides, and sensitivity to extreme climatic conditions. A number of Elders and Aunties detailed their recent actions in building rock walls and wind breaks on their properties with local materials to minimise the movement of sand or reduce the impacts of strong winds.

3.2 Revegetation and planting to combat erosion

There were strong voices from Elders and the youth of Erub Island to explore future options for revegetation, particularly for the crucial areas of sand cays near Erub Island, mangroves and fore dunes. Such strategies are direct and solid approaches to combating future erosion due to increasing extreme weather events and more severe tidal influx. Quotes exemplify the knowledge of the importance of mangrove, sand cay and other riparian vegetation and the need for future action.

Such an approach is recognised as a significant adaptation strategy to the impacts of climate change. Programs in numerous communities, including the Mekong delta in Vietnam recognise this as an essential adaptation strategy to combat tropical cyclones, to protect freshwater aquifers from inundation and protect homes and land from serious erosion (Department for International Development, 2004). An additional benefit from such initiatives is that restoration and revegetation of mangroves and coastal plants creates habitat for fish, crustaceans and birdlife that can inadvertently improve food security and livelihoods in the long term (International Institute for Sustainable Development, 2003).

Revegetation was a key issue raised by a number of interviewed Elders and youth. This section begins by providing quotes from one Elder who offered in-depth descriptions on past environments, present day practical revegetation activities and how he would like to see them become more frequent in the future. This section then goes on to document and describe quotes from the voice of young people on the island.

From interviews conducted, one Elder was very passionate about revegetation activities to combat erosion in Erub Island's coastal zone. In reflecting on the low-lying coral cays in the Torres Strait, this Elder also provided some practical solutions, based around vegetation and native grasses, to assist in combating erosion and impacts from sea level rise. As articulated by the Elder:

> 'The central islands, I'm very sorry for them but, these low islands, and seas [are] rising, we got to find a strategy where, how can we get the island to come up? They need to look at what grew there before, in their community before humans arrived and live on it. The island couldn't have come from nothing to something if it didn't have […] 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 [that] 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 […] plans… A big island like Darnley, is more stable, but you still got erosion, because the rising sea. Never mind how high the hill in Darnley the sea still rise. I told my uncle the other day; he lives down near the creek there. He lives all his life down south, come back, he got all beaut plan. He want to pull out all the weeds there and then, I said, 'No, no, no, uncle; everything must stay. You pull them out, then you got erosion. Them grass, nature, God even put in there for that purpose. So they must start there'… Erosion, it going to happen naturally, it's not a man made thing. Erosion is going to happen naturally, but you must minimise it to lessen the effect. You remember, humans got to live too, and so we need to cut up land these days here. But before we do them thing, you must really understand that environmentally, where water, it flow, how much ground you be cutting, will it end up in the sea and they ruin something else down there? It's not; you got all another thing link with your little job up here.' (Elder, pers. comm., 2009)

During the first field trip to Erub Island, JCU research team members were taken out to east sand cay near Erub Island. On a practical level, this Elder involved his family to revegetate and hence protect and stabilise this sand cay using three different native grasses and sand runners. The Elder described this activity:

> 'You see the sandbar, it stabilised and elevated itself above sea level. So, this one here, the same. You can see in areas where it's higher than other parts, that's because the grass would've been growing there and the sand has blown there okay and that elevation come up. That's what, any them sandbar eroded I urge people to take them natural grass, traditional grass and go and plant them and that's how the sandbar will retain will keep the level above sea level as the water rise they go up to. There's no quick fix solution… You go to places like Broome in Western Australia where you always got strong winds and cyclones, it's seasonal, and you see beaches four or five metres high. Why? Because the grass been there, the wind blow the sand and it's stayed. So, there's no question about how high this sandbar could go. They'll only grow if the vegetation is there; they won't grow in nothing.' (Elder, pers. comm., 2009)

Figure 7 shows the revegetated and stabilised east sand cay and demonstrates the use of the newly revegetated sand cay for Erub Island community members. The revegetation has not only been of benefit to other species for habitat, but it is also of recreational benefit to the local community, who can use this cay for reflection and relaxation.

Figure 7: A revegetated site at east sand cay, Erub Island. Photo by Karen McNamara.

This Elder continued to provide keen insights into the management of the coastal foreshore. This knowledge was based around adhering to the traditional laws of the environment; about leaving nature to rejuvenate itself and providing little interference:

> 'We have the things for a coastal zone, they're left there, Aiel, they plant it on the foreshore. They stay there. You don't go pull them out… Creeper around on the foreshore, they there to hold the sand, so when the wind or tide blow the new

> sand over them, they all that sand there, 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… The island should be okay. If you, in a place like Darnley and the sand cays around, we took you to the sand bar there, you see sand bar, 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. But when them thing you remove, that's when we got environmental disaster. 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. No greedy, grab everything one time, finish… That's how you call it. You cut a clamshell on reef; you want to eat clamshell meat. You turn the shell over; you no leave the shell lying there. If we turn it over, not only are we turn over so no one else can cut their foot, but they become shelter for another creature, can hide inside there, in the infancy stage and grow, then come out. You know, it survive.' (Elder, pers. comm., 2009)

For the young Islanders interviewed for this project, planting and revegetating parts of the island were of paramount importance, especially the reestablishment of mangroves. As highlighted by the young Islanders, actions and activities taken to revegetate Erub Island would assist in halting erosion and sediment run-off, as demonstrated by the following interview excerpts:

> 'OK, how I would like to see my island is, I think, a lot of vegetation, revegetation already with families making gardens and, yeah, and they're getting back into it, and yeah, looking after our land which would probably display how we did with it before.' (Young Erub Islander, pers. comm., 2009)

> 'The mangrove is the most important part of the islands, like a strainer. And people are pulling it out, which no good. The young fellas lift up the mangroves to put the net under to get the fish there and the mangrove is pulled out, they don't need to do that. We are depending on the sea, we need to take care of it, it's our livelihood.' (Young Erub Islander, pers. comm., 2009)

For one young Islander, not only was revegetation and the reestablishment of mangroves needed, but strong leadership in particular was necessary to ensure that these actions are executed:

> 'Culture is still the same but not being practised like it used to be. They teach you about your culture and how to look after your island, you don't burn the grass or accidently start a fire; so much water is wasted. Maintaining the island needs stronger leadership and they're not, they only look at development not erosion, only what they can build. We need investment into reestablishing mangroves, these things on the island need to be looked at first, before you develop anymore and get more erosion. I think we should have catchments to catch the rainwater all around, its only an island so should be able to do that all around the top of the island, and so all the rubbish doesn't run out to the sea, including the topsoil.' (Young Erub Islander, pers. comm., 2009)

Revegetation was an issue raised by Elders and the youth of Erub Island to combat future erosion due to increasing extreme weather events and more severe tidal influx. As this section has discussed, further significant actions to repair mangroves, sand cays and other riparian vegetation were considered by interviewees as important steps to minimising the impacts of climate change.

3.3 Revitalising past practices: Fish traps and gardening

Based on interviews with Elders, Aunties and young Islanders, it was evident that people genuinely wanted to revitalise the past practices of maintaining and working on stone fish traps, and gardening. From these interviews, Islanders spoke of reestablishing fish traps and creating further food security. Likewise, Islanders spoke of a desire to garden together and grow a diverse range of food crops for individual consumption and to share. The concept of community gardens is well documented as being an avenue for people to come together to not only share food but to build ideas and create a sense of community.

While these measures could be considered as more indirect adaptation strategies, they build social resilience by establishing healthy communities and creating a space to talk about changes and potential approaches to adapting to further changes. Diversification is seen as an important strategy to build resilience (IUCN, 2008), and this is evident in the quotes documented below. These and other ideas are voiced in the following quotes and at the heart of them is the desire to increase the capacity of the community to cope with future changes in local conditions (Osman-Elasha *et al.* 2006).

One Elder provided insights into the fish traps on the island, including how they operated 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 that you need to use that… 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. So we go and fix all the crack in it, the crack in the fish trap. Then you get the fish you need. You probably get the fish you need for a couple of days. After that you let it open again. So you don't have bigger fish like shark coming in and break all the fence down and stuff like that because you've got no dead fish or any other things in the rock that actually the shark can get to it and knock the fish trap down. So fish just come in and out and so your trap still stay in a very reasonable maintenance and condition. And that's happened on a regular basis but now, it's a lot easier to come down the walking track line and get a fish off the wharf than go and maintenance your fish trap, but for people like me who hold on to the fish trap, it's got to be kept on maintenance. If you don't in the next ten years you probably don't see it there. It just sort of goes away… It's a lot easier to maintenance when it's neap tide because you don't have to bend down so far to lift a rock because if you've got a bit of water in there it gives you a bit of leverage in there to move around. It's only that when we knew it's the tide that we're going to sort of block the crack in the trench, we know that but the fish don't know that. So what actually happens the fish still stays at the back there. He'll wait until the lowest of the lowest because he knew that he can get out to the lowest tide because there is an area there, a channel that he'll go through, but now we one day ahead of that fish. And at that time we never actually go in until the trench is completely dry and everything seems to go to an area, then we go collect from one particular area all the time. Because all the old people says never goes in when it's still got plenty of water inside. What actually happen then a lot of the fish will go into the rock, then you end up when the incoming tide come in, the shark will come in and knock all the thing down and try to get to the fish because there's dead fish in it. We're not allowed to throw rocks in the fence and if my wife be pregnant I not supposed to be in the trench.' (Elder, pers. comm., 2010)

The Elder also provided knowledge about the age of the fish traps:

> ‘This sort of thing that used to go right back when the first explorers come through here. Captain Bligh, when they were tracing all these people on the mutiny the things come around. So that gives you an idea how old is this. They’re probably three or four hundred years old. I didn’t know that until we were looking at the history of the early explorers that come through. In one diary of one log book one of the first mate, Captain Tobin. There’s a cay out there. They call it Tobin Cay after an English explorer because the natives gone from here to ambush them and in his log book he copied down on that day that they come in the little boat. He says, ‘We see some natives in a fence’. So it’s got to be the fish trap because they explain to where the fish trap was. So just give you a general idea how old is this thing. And if you go two hundred years or maybe three hundred years old, that fish trap, they probably a bit older than that. For the people that actually build it must have some idea of engineering because if you look at any fish trap how they design it and one particular area of the fish trap they’ve got a deeper area that when it’s low tide every fish go to that one area.’ (Elder, pers. comm., 2010)

On this theme of past practices, one Elder made a strong point about the need to move the emphasis off technology and instead restore these past practices in the community and in particular the teaching and maintenance of the fish traps:

> ‘Oh, yeah, I'd like to see that and I'd like to see the people on the island change the way we used to live. With all those new technology thing, they just drift away with it! You see kids walking around here with mobile phone up in the air, they try to pick up something and don’t see where they're going and we got car on the island now, could knock 'em out... The year before, I don't know what happened to them, when I come back to live here. The main thing is you gotta maintain the fish trap, too. The law, when you go you pick up rocks and put it on top again. You don't throw it; you just take it up and put it up steady. Make sure they secure there. During the day and during the night you go in the low tide, there's a lot of fish in there.’ (Elder, pers. comm., 2010)

Figure 8 illustrates the stone fish traps around Erub Island.

Figure 8: Stone fish traps at Erub Island. Photo by Karen McNamara.

One Aunty in an interview explained how the fish traps on Erub Island were used for sustenance but also for sharing amongst family:

> 'Four families there was that trap. If you go inside that trap you get fish, you have to share with them others, that's what we always do, share, but these days don't see it anymore. You know, Karen, I can understand. When I went to my cousin's […] we were talking. She said she couldn't understand too. I said, 'Why do we have to be like this? We don't share things anymore'. I said, 'Maybe the money we get or maybe get big money now'. Before that, there was no money, no pension, they have no family allowance, nothing. But we didn't starve. We got everything [because] we eat from the garden and reef. Sugar, we didn't know sugar, used to use tea grass.' (Aunty, pers. comm., 2009)

Interviews with the younger Islanders revealed a good level of knowledge about fish traps:

> 'Stone fish traps, leave gap so fish can get out, close it up when want to collect fish. Normally a caretaker, male, per fish trap; they do repairs, maintain the stonewalls, open it, close it. Up to three hundred fish, turtle, shark, even dugong if lucky they come in at high tide to feed off fish and grass. Women come down to help collect fish.' (Young Erub Islander, pers. comm., 2009)

For another young Islander, the knowledge and stories from Elders about how the fish traps were used in the past was valuable:

> 'To come and celebrate whatever occasion that they were celebrating for, and, plus even knowing the stories about the fish traps and how, how before that, a trap, that trapped a lot of fish overnight or whenever and where the villagers would come and everybody would take a share for each village and families.' (Young Erub Islander, pers. comm., 2009)

Knowledge about how to maintain and use the fish traps has been passed down through the generations according to one Elder:

> 'My father been grow up with these things, even he know fish better than anyone else, he know what time to, you see, this spring time now, he come to like every quarter, that's when the new tide begins, when spring time finish, he close all of broken parts, whatever. Sometimes we get passageway, fish come in, fish go out, and when you want a fish for supper, fine like, we got some occasion, birthday or wedding or something big, that you want a fish, to feed the people, we go put that block like that, strong, because close them up all that place, when tide come in you can look with the pens, low, put him up, run your eyes over, this bit low here, put till all the places come the same level, when the tide come in. Okay. You must go to the first low tide after you close, you fix that because all the stone rock up inside... because the first low tide, the biggest catch you're going to get. Whether night or day, because you work on day time the high tide in the day and that when you go back, the midnight, the low tide, the same tide like in day time, the same king tide at night. So at night, 2 o'clock, daytime yesterday, would be 2 o'clock the low tide, or today, tonight is 2 o'clock, when you go out the same fish trap, you can't believe your eyes. Fish. Either you collect them now for yourself or some tomorrow when you get all the fish, put them up in a small pool of water in the point… My father pass this down to me, and I pass down to my children.' (Elder, pers. comm., 2009)

The following four figures (Figures 9-12) visually document how people from Erub Island have used the natural resources in their environment to sustain their livelihoods. This has been through the use of the stone fish traps, scoops and poles, and casting nets.

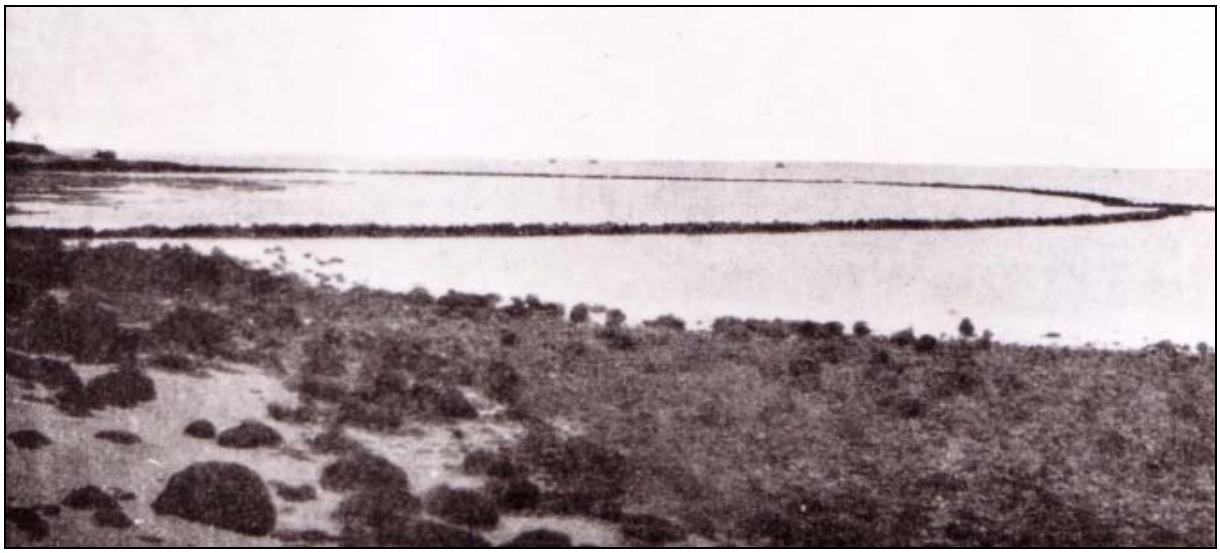

Figure 9: Image, dated 1920, of a fish trap on Erub Island. Photo by Reverend W. H. MacFarlane.

Figure 10: Image, dated 1921, of Islanders with 'weres' (scoops) and 'werir' (long poles, thickly bound up at one end), which are used to drive fish into dense shoals. Photo by Reverend W. H. MacFarlane.

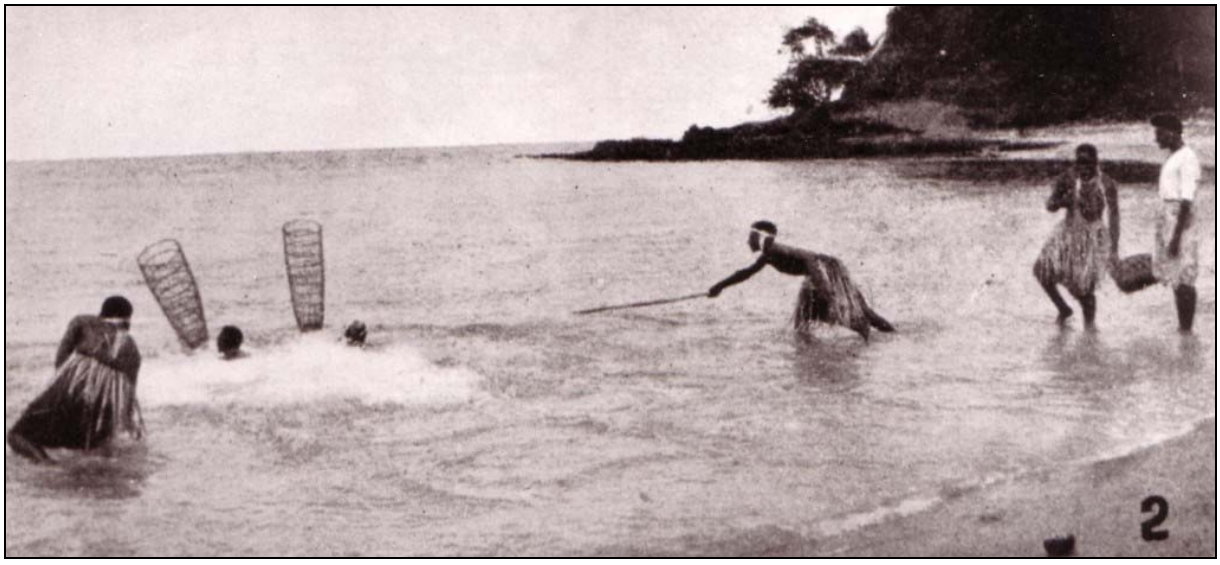

Figure 11: Image, dated 1921, of Islanders using 'weres' (scoops) amongst a shoal of sardines. Photo by Reverend W. H. MacFarlane.

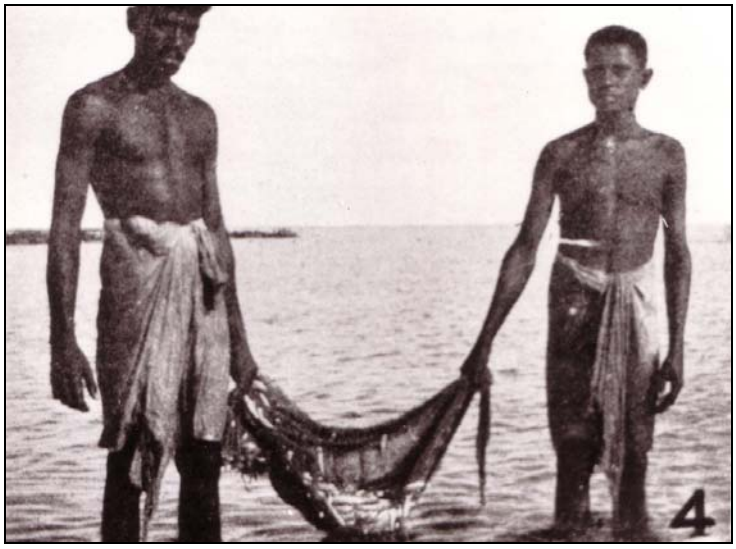

Figure 12: Image, dated 1921, of Islanders with a casting net after a good haul of sardines. Photo by Reverend W. H. MacFarlane.

In talking about the past and how the Erub Island community used to work together, one Elder described what life was like growing up on the island, providing details and memories of community gardening:

> 'I tell you what, when we grow up as a kid, every kid in my age from the time, my generation, we very attached to the nature, very much, very much, very much. We don't have the access to have an ice-cream or a soft drink or the lollies, nothing. Our connection through the line was very strong. I finished school at three o'clock. I go to garden at three o'clock and my parents have garden, like five garden or six garden, in different areas of garden and on the weekend we spend the full day and weekend doing the garden. We plant cassava. We plant sugarcane. We plant banana. We plant yam. We plant taro. We plant everything. Majority of our food actually come from the garden. We never rely on the store, never, never, never. Thing changes when I move away to college in 1970, [19]71,

> a bit. For instance, if I go to [Thursday Island] in the early [19]60s, when I come back, when I come back everybody in this village want to come and talk to me because they want to know if I had ice-cream and soft drink … I mean, it depends on every family and everybody as a community as a whole to take the responsibility and tackle it head on. If this community is not united, it's not going to happen. It's going to be just on a few families that are doing it, will be doing it continuously but 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.' (Elder, pers. comm., 2010)

For another Elder, community gardening was an important part of the structure of the community. It allowed the Erub Island community a space to work together and share, and also provided a healthy and subsistent living, as emphasised by the following quote, worth quoting at length here:

> 'So, back in those days, in 1930s and 1940s, if you looking back, about eighty to ninety percent of people usually live off the land, they own a [garden], like banana garden, cassava, sweet potato, pumpkin, corn, the seasonable crop, watermelon. And they usually go through from one dry season to another, they make a bench, or barter we call it, at the back of the house. With bamboo structure with the floor, and they stacked all the pumpkins and sweet potato that's digging off the garden, just to go through the dry season until the next set of season come in. We get some rain with southeasterly; you can get up to about four or five months the really dry season. It's pretty hard. Because it is a volcanic island the soil is very rich, bit of irrigation you can just grow anything. But, this day and age, you would think it more easy when people will have the dollars now to be spent somewhere else instead of... And the younger generation seems to be in a different way of expressing their culture at this moment. So, it's not like before, people sort of follow the pattern of the changing of the tide, they go out hunting on the weekend, to take them through… But there's been practicing all along to survive at the time. Things have changed here just now because there's more dollars now in town, and people will go down to buy those things off the store. But in those days, where people still enjoy the healthiest, I think, or healthier living, you live off the land by making your garden. And it's also the feel that there are few, maybe a few sickness at the time. I think obesity sometime it is a worry for us in the community, or diabetes, where believe that in some combination you don't eat the right food and some combination you don't do exercise enough. I think they sort of match together and this is what we hear just now. But there has been a lot of talk, even when I was with the Darnley Island Community Council and we always believe that we should go back and introduce the gardening and get the CDP to involve. Or re-forestation for the kids to accept the way people used to live… On the gardening, they have their own plot of land, like something's been handed down from the ancestors. And also the clan maybe have one huge garden between themselves, just for them. But people used to share whatever […] whatever that area there. They can make the garden by everyone relating to everyone in the community. By people talk to people, okay you can have this piece of land here, and have their own garden sort of thing. Maybe a watermelon garden or sugarcane, this sort of thing, banana garden. Then you have your own plot. Like I say, once the dry season started they can pick up all the crops and put it onto this bench, to take them through to the next wet season.' (Elder, pers. comm., 2010)

One Aunty revealed in an interview the story of how she used to be involved in the gardening with her family, and how her knowledge about planting times for the garden, and maintaining gardens and fish traps on Erub Island was passed down from her father. As she explained:

> 'When I was little, my father and mother always telling us about, because we always plant our garden with bananas and yams and we have these special yams … And he always telling us that you know, when we, they must plant it in that September, October, because it's summer time and you have time to do all your gardens and stuff like that. Even for the fruits, we always have mangoes in that time because on my dad's property there's lots of mangoes there. 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. Because if you build it up and when it's, the tide went down, the fish will see and they be in a hurry to go out to the sea… But in the past, Dad and them haven't got the dinghy with the engine, they just go sail… And Dad always said, 'Wait here and don't go down to the sea'. Alright, we have to stay on the rock and wait. He just went down and he, when the tide start to go out but, you have to stand and watch that fence, he judged the tide, 'Oh, I think it's time now. We going to really build up'… And whenever he closed that fence, he have to really close it with no passages where the fish can go to. So if the fish is up and they knew that there is a passage for them to go, but if they too slow and the tide is already out, they can't go through the fence… In the past they didn't sell anything, they just share, but not anymore. These days now you got to, as soon as you caught it, 'Oh, I'm selling for that, that'. But in my dad's time, even my grandfather, they never worry about selling anything... In the past it's so different. That's our lifestyle, traditionally our custom… To share because in Dad's time, I never saw them being selfish […] they just share. But not now... If you come to my yard, you'll see that I've got lots of garden, because he taught us. How to plant bananas, cassava, yams and sweet potatoes and we knew how to do it… The time to do it, normally straight after Christmas, you know, when we finish Christmas now, they said, 'Oh, we're going to'... we call it kumala; sweet potato. And they said, 'Oh, time for kumula now, let's go'. You know, talking traditionally. Because when we plant it in December and January by the time we come up to Easter.' (Aunty, pers. comm., 2010)

The Aunty also talked about respect for others and their gardens:

> 'You know, when we were little, if that particular family, they've got these things there, you don't just come and please yourself. You got to ask… Respect for them. And even we have our tradition, when all our uncle, they just go and tie a leaf around a coconut, just to keep the coconuts, so they can have more fruits and everything… When you have coconut leaf over something, you not allowed to touch it… Oh, and everything on the island in our time, if you see this, when they start to bloom, you know, with flowers, you're not allowed to touch it… You have to keep away from it, because that tree will produce itself with the fruit, when it's time for the flower to come out and it's time to fall over, fell off it. And when we have the little fruit, you're not allowed to go next to it. You have to wait until it come bigger and even not, don't touch it unless your aunty or uncle said, 'It's time to go'.' (Aunty, pers. comm., 2010)

Another Aunty in an interview spoke of how gardening was a poignant part of their upbringing and how this has now changed in the community:

> 'I just talk to you about my parents. When I was like young; you know when you come to about ten years […] old, you start to notice something and listen to Mum and Grandma talking about things like that? There's lot of changes now from the

> time when I was young. Everything was so, like for gardening; everything was so different, like gardening before. When we plant and things like that, it was big, you know food grow so big and nice and healthy. As we grow older to now, it sort of changes in the land side of, the way we used to live in the land. Now sometime when you do gardening, before, we don't use fertiliser; we just grow things naturally and the good food, fruit from the tree. Even you see the mangoes there, they're sort of different. We don't have things like fruit fly and things like that, all the changes. We don't know, probably from the weather, things are travelling overseas with this and that. Everything sort of been healthy before until now, with the weather changes, it changes the thing on the island, even on the reef.' (Aunty, pers. comm., 2010)

The Aunty made it clear that the food from the gardens was plentiful and healthy. She also made reference to the changes to the environment, and the waning community interest in gardening over time. She went on to describe in the interview how the gardening system worked on Erub Island in the past:

> 'We [women] usually do all the gardening, everybody work together and on the reef together… They [men] would plough the ground for sweet potato and cassava, things like that, and [women] do the planting, but the [men] must be there to plough the ground… They used to be up on the hill. You used to go on a small track in the bush until you come up to our garden. There's more good soil up on the hill. But now, when you're down, we start to notice when we have bush fire and every time it used to rain, all the good soil come down from the mountain. That's why we didn't have dirt pulled from the garden anymore because all the good soil come down from the sea, wash down… You just have to pick a place, like the community want to do a garden together, they have to pick a nice place to do gardening. Before days, you could just go and put a garden where you want to do it. But native people give you this land and you go and do your gardening. This time lots of arguments going on about the land.' (Aunty, pers. comm., 2010)

Another Aunty had a similar story about working in the gardens as a community, sharing as a community and growing plants all year round:

> 'In our days we always help our grandparents for do everything, but this time kids, they don't know how to do gardening. Making garden is really important. You have something in the garden like cassava and banana, that's all year round to eat, all year round January to December. In the garden, sometime we have tea in the garden there. Make fire like while Aunty will to go get fish, on the farm we come together. We all cook the roast and we all eat together. Sweet potato and someone might carry damper or something. So we don't want to eat, we very full now. Them days were very good, you know. We learn a lot about older people.' (Aunty, pers. comm., 2009)

For one young Islander, the interconnectedness of subsistence living on land and sea country was important. As demonstrated in the following quote:

> '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, pers. comm., 2009)

This quote is an important conclusion for this section. It highlights the need to revitalise and continue self-sustaining and sustainable fishing and gardening practices. These indirect adaptation strategies have the potential to build social resilience by establishing healthy

communities; creating further food security; encouraging a sense of community; and providing a space to discuss changes and potential approaches to adapting to further changes.

3.4 Women on Erub Island working together

Robust social networks are seen as an essential component to build a community's adaptive capacity (Ford *et al.* 2006; Tomkins *et al.* 2004; IUCN, 2008). Strengthening social networks can allow for communities to better manage resources and resolve future disputes (Woolcock and Narayan, 2000: 226). Social networks involve mutual obligations by their members and strengthen and create resilience in communities (Putnam, 2000: 20).

The women of Erub Island have been working together to strengthen the social networks within their island community. Women on the island play a crucial and essential role as household, community, and natural resource managers. Practitioners and policy makers in a number of countries including 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 following quotes illustrate the strong networks that are emerging amongst young and older women on Erub Island.

In an early interview with an Aunty, during questions about the role of women in community structures and environmental sustainability, details of a women's group on Erub Island were provided. This group is called 'Women of Erub Sharing Skill, Knowledge, Experience to Promote Unity', known on the island as 'WESSKEPU'. The Aunty provided insights into the importance of this group in building community unity and capacity to adapt and grow with change:

> 'It's important that younger [women with children] 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.' (Aunty, pers. comm., 2009)

This Aunty also continued to reflect on her work at 'Erub Erwer Meta' (the 'Darnley Island Arts Centre'). The purpose of the Centre is to 'revitalise traditional Erubam le and share it with the world' with artists drawing their 'artistic inspiration from their identity, connection to their totems through traditional and contemporary stories about their land, sea and family connections' (Darnley Island Arts Centre, 2009). Many of the artists at the Darnley Island Arts Centre are women who specialise in painting, printmaking, lino drawing, jewellery, textiles, weaving and wood-fired ceramics. As described by the Aunty:

> 'Today, as member of an arts centre, I enrolled myself the other day, you know, and I, well, 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. For me, I just done two t-shirts for me and my hubby, by just painting and put it, you know, here and there, and then, you get ideas straightaway. It's, 'Oh, I've got to do this and that', 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 it, you know.' (Aunty, pers. comm., 2009)

Figure 13 provides an example of one of the many artworks created by women around the island. The caption at the bottom of the photo describes the piece, made from brightly coloured packing-tape. It states that the Aunty often incorporates 'decorative elements,

traditional language and symbols. Based on Erub (Darnley) Island, she continues to produce innovative baskets that speak of Island life, of cultural inclusion and adaptation'.

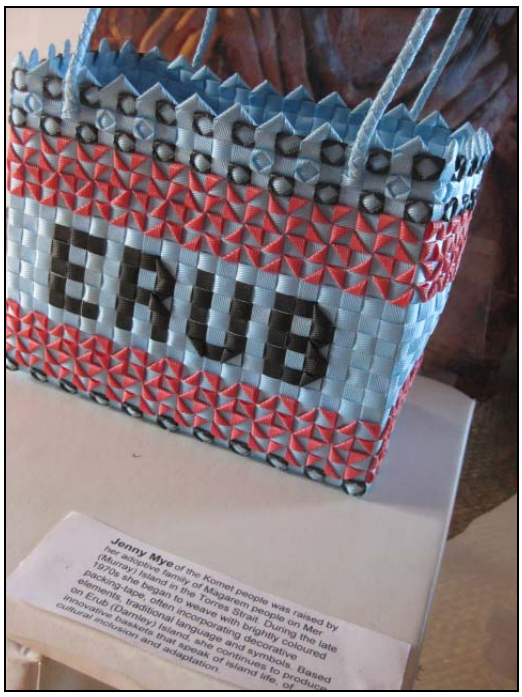

Figure 13: A woven bag, made by an Erub Island Aunty, on display at the Darnley Island Arts Centre. Photo by Karen McNamara.

This same Aunty that described the women's group and involvement in the Darnley Island Arts Centre went on to describe the strength of women in the community, in bringing everyone together:

> 'I mean, old people, you know, they are getting old, they can't go up to their garden, you know. Why not the woman, you know, go and do it for them. Help them in the house, you know, get them together, get your kids together, your grandkids and what not, have a fun day, you know, sing song and that, cook something, give it to them.' (Aunty, pers. comm., 2009)

In another interview with an Aunty, she explained working in the community garden when she was younger and placed emphasis on sharing amongst family:

> 'But this time, sometime you heard people say, 'Oh, I feel hungry because we not had bread'. Not in the past. My mum and them, we just have all the traditional food. We never got hungry. But now sometimes, because up at the school you see the parent come, 'Sorry they didn't have lunch because'… But, in the past we just fine. Everyone, we just share as a family because whatever you have, you gotta share with somebody. And this is what my brother and myself, we brought up. So what we have in our garden, we share.' (Aunty, pers. comm., 2010)

Another Aunty emphasised community structures that entailed everyone working together to foster a strong and vibrant community:

> 'I would just wish everybody work together, all the community people work together now. Try to build up things together. Like in the old days, help each other. Care for one another; this island would work nicely if we care for one another. Things like that or argue about this and that; things will never work out.' (Aunty, pers. comm., 2010)

For another Aunty, the concept of women working together was important, but so too was the recognition of the strength and willpower of women and willingness of the younger generation to learn from the older generation:

> 'Well, I think I look at myself when me and Bully went to hospital. Bully was a big man and he older than me, ten years between us, not ten, five. But if I wasn't there something could happen to him, because of me, I was strong and from that every time like really make me really strong. When I went to that meeting, this one lawyer, she's a woman lawyer and she is big. She always say about woman, that woman got a very strong mouth and willpower. Same as like, if we had this business, it was always my dream to have a business. That was my dream and after this business I can still see my head you know but we need the community. There's lot of things we need in the community for young people. I really like to help young people. It's a shame you see them. They're not interested in them sort of thing. Well I think here or maybe some other island, they'd be ashamed to amongst older people. But we only know you; you have to learn from all the people. You can't learn something from yourself. You learn from your parents and you learn from all the people you know. I know a woman is a very strong, very strong woman. On Thursday, we have a woman organisation and we call it the Murra Care. Murra in my language that's everyone, there language here and a woman, every woman. Every time when we go in and the boys or the men see us they say, 'just come again to report on your husband'. I said, 'yeah'. Make something wrong there; just grab the phone and just ring. They don't stop. Two person have to talk together and discuss everything, settle things. I know woman is.' (Aunty, pers. comm., 2009)

This section has presented a discussion of how robust social networks can form an essential component to build a community's adaptive capacity (Ford *et al.* 2006; Tomkins *et al.* 2004; IUCN, 2008). In this instance, the women of Erub Island have been working together to strengthen the social networks within their island community.

3.5 Reading and respecting Country and Community

This section takes a more philosophical turn. For many Elders and Aunties interviewed the theme of reading landscapes and the importance of recognising and responding to indicators in the landscape that highlight change, shifts or triggers for action was very pronounced. In tune with this was the theme of treading lightly and maintaining respect towards land and sea country, as well as respect for others. The following section therefore fleshes out both these philosophical and practical themes that have emerged from interviews on Erub Island.

One Erub Island Elder provided details as to how they used to and still 'read' their landscapes:

> 'Before that we follow the stars. We know which star when the high tide we know which star to follow. On the low tide they change. The stars change, too. Like we call that star 'Southern Cross star'. Today they call it Tagai and named the school after Tagai… Yeah, like biru biru and the Torres Strait Bird. Those birds they can tell a lot of things about it. If they look weary they come up, especially when we out on a boat, I been on a boat a few time and I seen a bird come sittin' on the deck and we know the cyclone is coming up, strong wind. We got caught out there outside from Cape Grenville, got cyclone across the Cape York. We got no wireless to tell us cyclone was coming that way but, our skipper watched the bird. They come, they rest on the boat, and he said, 'Oh, something happened'. So pick up anchor and come alongside mainland and maybe in the morning you wake and you see green leaves on the deck and the boat, cyclone. I experience

> those things; even down south the same. Way down out from working on a boat and when we see a land bird out there, we know that something coming, so you would have to come in. A few days after that, a strong wind come up.' (Elder, pers. comm., 2010)

This Elder continued to provide his knowledge of reading triggers in the landscape, for instance to know when to go out turtle hunting. In his discussion of this, the Elder appeared frustrated with how current turtle catch occurs with little regard for 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. They got more in their flesh because the male ones, the old people said, during that time the male one, they don't look for food. They go chase some female one and they say make them poor. They got nothing much in the guts, get the female ones. When he come back to 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. Especially when we out in the boat you know. Let it go, you chase a male one. 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 use. 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. Even if you haven't got dingy to go out on the reef, you just walk around the island and pick it up, like clamshell. We live on good meat to eat, clam shell, all them on grass, little shell, like conch shell and spider shell. 'Cause there's 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 [them] 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. If you see the hard way we been come up, we saved everything. We go out taking one. Everybody have a feed and we still got plenty.' (Elder, pers. comm., 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.

> 'To be honest, I never actually […] follow that the Tagai through the thing. I leave that, more or less, to my parents, my father in that sense. I would look at other thing, for instance, when my father used to plant yam it's got to be certain tide. The moon got to be in certain position because he believes everything is connect, which I believe is true. Either the tide is going to be in the neap or the moon probably in a full moon or quarter. Yeah, round about March… I mainly plant cassava, sugarcane, pawpaw and sweet potato and banana… Sugarcane is more or less a seasonal thing and cassava, banana, yam, because they are all year round. Sweet potato he grows at a certain time and then he finish but cassava and yam seems to be the one that actually main source of food… Sugarcane it comes on seasonal thing and then it goes and watermelon and

> corn, they only for about two months of the year, then they finish.' (Elder, pers. comm., 2010)

This same Elder talked about the value and importance to connect to country and through that, respect these landscapes. This Elder makes the point however that at present, it is a challenge to transfer knowledge to the younger generation as they are torn between two different cultures:

> 'We were so close to it […] Even in lot of scrub which we have there in the garden, have accident and cut myself with […] we got a tree that you can go and chew and put a thing on to stop the bleeding because all the things that we have to leave off we more part of the nature now when now really we live in a totally different world, everything exposed to boost them up… It's so important for the generation now, I say for my kids to understand, you connect to the land. I used to look after the land. Don't abuse or whatever to the land. It's the land that actually will give you life because you make your garden out of it. You drink your water out of it. You can do everything off it… Very different. Everything changes. We understand that change has got to come but the changes come and a lot of the things that we've learned in my time doesn't follow it up. We know about it but our kids don't know about it because when we, when we born to this island as soon as we start, learn to talk and do things, that's where the teaching begin. That teaching about your land, your culture and everything. So as I grew up I grew up with it. So it's a lot easier for me and when my parent passed on I pass it on to my kids because I grew up with it but I find I pass it on to my kid, it's a gap. Some want to take it on; others want to move on in different direction.' (Elder, pers. comm., 2010)

One Elder spoke passionately about the traditional laws on the island and pushed for this to be transferred and adopted amongst the younger generation, to respect and live in harmony with their land and sea country. As the Elder stated:

> 'The thing is, [the] kids must learn the traditional customary ways and the laws, because them law is based on natural environmental things and protection of them things. Today laws also have them, but today laws also got bad things inside. 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. They say, you pick out, you know the language for drought relief? You know how the language for endanger species? Everything have survived because you stuck to the calendar, them ancient people.' (Elder, pers. comm., 2009)

For one Elder, the theme of respect was very obvious in the interview with him. The Elder talked about how respect for property, including the fish traps, was embedded within the community structure:

> ‘Anyway but from this generation when I grow up we were very attached to the land and attached to everything [… At about 1975] things started changes, come to [19]80s and now to [19]90s, it’s changed really dramatically. It’s changed really fast. Now, when I come from school if I come down the steps down the school here I stick to the public road. I don’t go through that yard or that yard, no, never. It’s taboo to go into somebody else’s yard without their permission, even to go to somebody else’s fish trap without a permission. If I walk past somebody else’s fish trap and there’s fishes are there, I don’t touch it, never. I go to my family fish trap. I pick what is there. If a person ask me I will look at the fish trap there, then. Now, nobody this generation got no respect for anything. They break your banana garden. They climb your own almond tree and break your almond tree and they come, they play in your yard... So from when I was brought up to this generation you’ve got a big gap. Now, that generation now, but for instance all my daughter gone now. I don’t know whether they going to hold on to what we’ve got or not because they’re losing it really fast. For instance, the proper traditional way to make a hungi, you do it a traditional way. This generation they don’t do that but you tell them stop chucking pile on it and burnt it because they all treated timber but they doing that because it’s so quick to do that, then exercise your traditional way to do it because when you exercise the traditional way to do it you’ve got a lot more work inside because you’ve got to do this, you’ve got to do that, where if you’ve going to make a hungi you just chuck a pile there and chuck some, chuck a bit of rock there and up and away. So this is one area that it’s been changes and there’s a lot of things, changes, from when I was brought up, the respect for elders and respect for other people’s property; it’s no longer there.’ (Elder, pers. comm., 2010)

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

> ‘Like if the boys go out hunting for turtle and they come and cut it, you have to respect the thing, don’t waste, that’s bad. 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, pers. comm., 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:

> ‘People like in our island culture, you have to just take it and leave some for the next day or for someone or leave there to go on, because if you take everything there’s no one left to go on… Like some people like, like in greed way they take everything but our culture is take enough and leave enough for the next day. That’s the way you preserve them thing for the next generation. Like we got the turtle and dugong management here, like before time we got only pulling dinghy. We ate turtle maybe three times a year but now when you got dinghy now, people can go out take as much as they want… Yeah, I believe I think, by doing this people will really know our identity and how we will respect towards the sea and the land. If kids can more interact because you, like you can see the thing instead of you talk, like you go see the thing. Like for the clam shell, when we take off the meat, we turn the clam shell belly down because you know, so another animal can come and live under there. Because it’s an insult when people like just leave it like, you’re not respecting, you’re just take what you want

> and just leave it there. So you have to turn them around so it will be home for other sea creature.' (Aunty, pers. comm., 2009)

Another Aunty tells this story about respecting land and sea country, and how she attempts to teach it to her grandchildren to now practice:

> 'Yeah. I always tell them boys, when you're finished with a clam you have to turn it over, don't just leave it open there, turn it over. Take what you need. Don't take too much because leave it for next time 'cause you're still going to go out there. Grandparents, they never waste anything mighty from the sea, even the turtle wing, we eat everything.' (Aunty, pers. comm., 2009)

For one young Islander, sentiments of caring for country were very strong when discussing the future of Erub Island:

> 'Sea country. I guess with all the laws now with the amount like the crayfish, the amount of crayfish you can catch within a season and with all these seasons whereas before there never was a season to actually bag to, to catch crays and other products from the seas. But, I guess probably more education now on it, you know we are looking at ways of maintaining our food chain in the sea, our local food chain, but I guess if we know to, if we look after the land and also in the sea… I think if we do look after both areas, I think we would have a pretty nice peaceful and a productive life.' (Young Islander, pers. comm., 2009)

This section has provided a discussion of the importance of reading landscapes and seascapes and recognising indicators that highlight change, shifts or triggers for action. Based on the interviews conducted, the theme of treading lightly and respect for land and sea country was also very pronounced.

3.6 Transferring 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 report, highlights the care and custodianship of country. Listening to country and reading landscapes are the hallmark of Indigenous science (Cajete, 2000).

While this knowledge is essential, it is imperative that it is passed on and continues to incorporate new learnings and experiences. As evident in Arctic communities, a major challenge for such an approach is resistance to passing down knowledge and sometimes excluding some from that knowledge (Ford *et al.* 2006). The following quotes highlight the commitment to share and transfer knowledge from the Elders and also the commitment of interviewed young people on Erub Island to embrace this privileged knowledge. The transfer of knowledge can also be highlighted by another outcome of this project, the documentation and explanation of which can be found in the report by McNamara *et al.* (2010). This report above illustrated that the seasonal knowledge of Elders has been embraced by the local primary school on Erub Island and students were excited to participate in and learn from Elders' knowledge and experiences. This section explores the voices from the young Islanders interviewed on Erub Island about the relevance and importance of traditional knowledge, particularly in how it pertains to seasons, climate and practices.

Before examining the views of young Islanders, a number of Elders spoke about the value and importance of documenting, safeguarding and transferring knowledge and ideas. One 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. All these sort of things, they all know to think of great grand, of understanding everything’s about life, but we just run and do our own things, nobody asks them questions or sit down to talk with them like I know. I got children always; you come ask me, you know, I get it from them you see. Because I interest with something, that’s why I try to pass this knowledge to the young people. Look for someone older than you who will know, who can honestly, to keep that tradition and everything that knows, but you know can’t be seen there, remember, you come from something that was there. Now, for instance, I tell them, Eddie Mabo... now Eddie Mabo build right down the back of Murray Island, the cemetery. Now he never used the legally got, you Native Title and everything was buried down the ground too. You see, I use him for example, and that’s why, use the little what you’ve got. It’s not how much you’ve got, but how well you use it what you got. The little understanding you got, you know, about those things, do it and help for your community. Help your people. Tell young people about it, show them. All the good things is down there. You’re buried… Therefore I just give an example for young people. Use the little what you got. And use it for your community.’ (Elder, pers. comm., 2009)

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 decision-making for the future of the island. As the Elder asserted:

> ‘Well, I'd like to see it grow under the rightful leader. Men that get knowledge from the olden days. This new, I don’t criticise them, but it seems to me that they think of themselves. They don’t come and seek the older people to get knowledge from them. What so and so in those days, it might help them in their new education, but they don't do that. They think, ‘oh, we’re going to do this’. It's cycling; it will happen before. It come round to this time they don't know what happened before. When they try to do it their way, it's not going to work. I've seen the days from my grandfather's time through my father and now my turn. What I say, we been struggle for survival during, before the war, during the war and after the war… It’s my island. I come back to live here after seen the life down south. I've come back to start off again. My mind tell me that, because I've come back to take off where my father left me. He passed away when I was only nine years old. Out on a boat and they sail all the way bring him back put him off here. Resting home. I think that what bring me back, because he's here.’ (Elder, pers. comm., 2010)

In another interview, one Elder reflected on how his knowledge had been passed down and the challenges of passing that knowledge onto his children. The Elder stated:

> ‘My knowledge was passed down by my mother and my father. They make a way I get it in my skull and once I know what I am doing and I knew how it’s supposed to be, and how the way you’re supposed to believe and that’s where we stay on one track. We exercise our cultural thinking and then when we went away to college we understand there’s two different life in that there but I still hold on to that but I also learn the other side of that culture but I still hold on to my culture. That’s why I’m still holding on to it where the generation of my kids and stuff like that, they lost that already. Only judging by the way if I talk to my daughter in a proper island way to do things in island way she stop and say, ‘What?’ So we as a parent trying to teach them, because they grow so fast and when they went away to college they all change there and when they come back they totally

> change from when you're trying to give them direction in traditional way and other things, your traditional life, it's very hard for them to cope with it. It's only a few things that they can sort of hang on to it but to get down to the grassroots level of it, it's very rare. I'm disappointed in a lot of areas; I can see that it will disappear… For me I can change from my kind of life to the mainstream life, I can do that. It's so totally easy for me and if I want to go back there I can go back there. I fit in the two lives. I understand that we've got to move on but I also understand. Like, I still understand my traditional way of life, whatever. If I lose that I'm nobody. Because everything is based on your land, your culture and everything. If you don't want to know that you're like an alien come from another world or something like that.' (Elder, pers. comm., 2010)

For another Elder, in discussions about strengthening the Erub Island community, transferring knowledge and understandings of clan totems was crucial to this process. The Elder made 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, righteo, 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 they 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. This one there's, that one go there. That's how tribe and teams are formed so it can regulate else everybody do the one thing and then all them species is finished… 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. They must have a dinghy so they can go out and see. Your kids won't learn anything if the parents haven't got a boat. It traditionally that all Torres Strait Islander need the boat and sometimes a canoe. A canoe normally a big boat, today we've got smaller dinghies. The house is still there but every father must have a dinghy for the children to come and visit this so he can pass it along. Not taking to school all the time because the school cannot teach you on the board, you must actually walk here on top of the sandbar and see real life yourself and things here. My kids come here just about annually. Sometimes not all of them but two or three of them. In some instance, all of them. I like to bring them so they can see, learn them laws of the reef, sandbar… Protection, they pick up things in the reef, only take enough, leave some for next time. We've got small land, which means take enough and only enough, there's other days coming. Not go and everything finishes.' (Elder, pers. comm., 2009)

The quotes presented in this section all reveal the importance of transferring knowledge across generations. Some of the following interview excerpts have been quoted at length, so as to ensure that the voices of young Islanders are included and heard. The dominant sentiment from these interviews is that knowledge about seasons, climate and how to sustainably manage environments is important and necessary to ensure ongoing sustainable livelihoods on the island. The following powerful quotes from two young Islanders emphasis this:

> 'I think it's very valuable for the Elders to pass on tradition 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 like, Kuki season is when, like December month to about April or

> May, is the Kuki season, which as you know is the monsoon, we call it Kuki. Then from May or June 'til about October, we have the sager season. That's when you get the southeasterly trade winds. Like everybody understand this is two seasons, like in the Kuki time when it comes to like fine weather like now, we would know the turtles are climbing up, they are laying eggs now, and they are breeding, laying eggs. In the sager time, the winds are very strong. We don't go fishing that much but this time of year we go fishing. We would know that the turtles are ready, also the birds at the sand cay, Bramble Cay.' (Young Islander, pers. comm., 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 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 still, but strong cultural belief also we learnt from Elders is to look after one another.' (Young Islander, pers. comm., 2009)

Another key sentiment concerning the importance of this knowledge to be safeguarded and transferred was that it provides insights into how the Erub Island community used to be. The following quotes emphasis this:

> 'I was fortunate to be around Elders and past Elders who passed it on to you to gain the values that they had, that they grew up with and being able to hear what they have to say, which is, had a great effect on myself here, taking it into this generation, I found it, it's been really useful for me, knowing blood line… I guess I happened to be an off spring from the four clans, so I just do have blood lines and you know, having that connectedness, dealing with all my Elders, in that, for them to tell, you know, how they grew up and how community back then were, was really strong… Caring for one another, each family, whereas, you know, before when you had the past feast and celebrations, it was just a big gathering where the whole families would get together.' (Young Islander, pers. comm., 2009)

Another message from the young voices on Erub Island was about culture, identity and language, and how Elders and Aunties on the island hold this knowledge and need to transfer it to the younger generation. As argued by a young Islander:

> 'To know these past, the past upbringing of our Elders in that they, really great to be part of, you know, to hear what they went through and how they, and for me, in order for me to pass it on to my children and to the next generation, which would really be a useful knowledge I guess, for the kids to know in future, so that we don't lose any of that cultural identity which we know our language now is, it's on its way out at the moment and we're trying to revive it and sustain it through Miriam Mer being taught now within the school. So, now we have taken that on board really, let me see know, there's a, I guess, there's a must that we, in order to maintain our culture and our tradition.' (Young Islander, pers. comm., 2009)

The following quote by a young Islander, and also a teacher at the local school, describes the value of traditional knowledge, how it can be applied to read landscapes and seasons, and ultimately the importance of having it transferred between generations:

> 'The Elders they see it now and they are telling us about the seasons are changing, especially with the weather. The weather will, sort of, affect the way the turtles will go and lay their eggs on that time, like if the Kuki season or fine weather comes too early, it may affect the movement of the turtle. If the sager season goes a bit too late, 'til after December, it may also affect the movement of the birds because the birds will have to fly against the strong trade winds, because with the birds, they lay their eggs on the sand cay and they have to fly all the way probably to the nearest place where they find the sardines. That's the mothers flying back to feed fish to their babies. They probably have to fly all the way here, but now it's very fine weather, it's easy for them, but if the season changed and the trade winds would blow around the winter months, went all the way up to December, it may affect their movement. They have to swim. They have to fly against a strong wind, maybe that comes in effect, it goes longer some years sometimes, like this year it's surprising, it stopped November. The other year was blowing up to almost the middle of December… Calm with the Kuki or if there's a cyclone about, you get the wind from the northwest.' (Young Islander, pers. comm., 2009)

Another objective of this overall research project, which is documented in detail in a separate report referenced at the start of this section, was to assemble knowledge from four Elders on Erub Island and create a seasonal calendar specific for the island. This objective documented knowledge about seasons, winds, animal and plant life, and bird migration from local island Elders. A seasonal calendar containing all of this knowledge and information was then transferred onto a large wooden mural at the local primary school where the school children actively participated in its production. The contents of the calendar, which were compiled from the knowledge of island Elders, will now form part of the teaching curriculum at the school.

This section has illustrated the commitment of Elders 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.

4. Conclusion

The underlying objective of this report was to present a series of views and experiences, based on traditional and current knowledge, that envision Erub Islanders as active agents rather than victims of climate change. In this way, the starting point for this project was one of resilience and vibrant communities with valuable environmental knowledge. In this instance, this knowledge is concerning the actions and activities that have been employed in the past and present to adapt to environmental changes, including climate and seasonal changes. These actions and activities taken by Elders and Aunties in the past and present can shed light on their ways of adapting to changes and living sustainably. This report has explored in-depth the local adaptive capacities and strategies of this community, according to the Islanders themselves – indicating community resilience in the face of changing environments.

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 report and the preceding reports in this series highlight that while climate change impacts do exist throughout the region, the people of Erub Island do have strong and robust coping mechanisms to reduce their sensitivity to these.

Adaptation strategies identified through interviews with Elders, Aunties and the youth of Erub Island included the revegetation of sand cays, mangroves and fore dunes, and the building of houses, rock walls and wind breaks using local natural materials. Reconnecting with past practices that diversify livelihood options also illustrate sound adaptation strategies. Approaches that build overall community resilience were also identified. These included: the development of social networks, especially women working together; reading and respecting landscapes to gauge changes and create sustainable responses; and the commitment from Elders to transfer knowledge and the voice of youth willing to embrace that knowledge. The following quote highlights this final point, articulated concisely by a young islander:

> ‘The world is sort moving, more modernisation comes in and roads and a natural weather pattern and everything, the natural world is being affected around us and we do notice it but if we could have just one meeting to discuss seasonal climate change and also input traditional knowledge into it from the Elders as well while they are still alive.’ (Young Islander, pers. comm., 2009)

For this young islander, his vision for the future of Erub Island is first and foremost to learn from the Elders to be better prepared for meeting challenges that may emerge from environmental changes. The young islander also sees a role for the younger generation in shaping responses in the future. Hope is evident in his view and voice.

A final quote, fitting for a conclusion, from one of the Elders reinforces the community resilience of Erub Island and points to one of the clear messages of this report – that adaptive knowledge and strategies do exist. This Elder shares his views on the second team visit to the island:

> ‘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.’ (Elder, pers. comm., 2009)

This quote reinforces that future planning on Erub Island must ensure that: local voices are listened to; traditional knowledge and laws are respected and integrated into decision-making; and any adaptation strategies require not only the consultation of the community but their active participation and inclusion.

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