

Chapter 27

Coastal Urban and Peri-Urban Indigenous People's Adaptive Capacity to Climate Change

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Abstract This chapter discusses the adaptive capacity of coastal urban and peri-urban Indigenous People's to climate change. It is based on the findings of a National Climate Change Adaptation Research Facility (NCCARF) funded project that utilised a series of case studies that engaged key representatives from Indigenous organisations in five coastal locations in three states of south-eastern Australia (Low Choy D, Clarke P, Jones D, Serrao-Neumann S, Hales R, Koschade O et al., *Aboriginal reconnections: understanding coastal urban and peri-urban Indigenous people's vulnerability and adaptive capacity to climate change*, National Climate Change Adaptation Research Facility, Gold Coast, 139 pp, 2013). The study has highlighted the social, economic and environmental impacts on urban and peri-urban Indigenous communities inhabiting coastal areas throughout south-eastern Australia. These impacts include a loss of community and environmental assets, such as cultural heritage sites, with significant impacts on their quality of life and the establishment of potential favourable conditions for the spread of plant diseases, weeds and pests. The study also found that opportunities did not readily exist for engagement with climate change adaptation policy and initiatives and this was further exacerbated by acute shortages of qualified/experienced Indigenous members that could represent their communities' interests in climate change adaptation forums. The evidence emerging from this research clearly demonstrates that Aboriginal people's consideration of the future, even with the overlay of climate change and the requirements for serious considerations of adaptation, are significantly influenced and dominated by economic aspirations which are seen as fundamental survival strategies for their communities.

A number of specific climate change induced issues to emerge from the research included: the potential for Indigenous involvement in the 'bush tucker' industry utilising wild plant species will potentially suffer from changes in species

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availability; concern was expressed about changes associated with peri-urban and urban development which appears to be escalating micro-environmental changes; peri-urbanisation is a major environmental change which threatens cultural assets including Aboriginal sites; Indigenous communities need representation in climate change adaptation forums and to be more directly involved in land and sea care projects. The chapter concludes with recommendations to better position Aboriginal engagement and knowledge systems in the wider climate change adaptation policy discourse.

Keywords Climate change • Peri-urbanization • Micro-environmental change • Aboriginals • Indigenous communities

27.1 Introduction

This chapter adds to the foundation of Indigenous ‘country’ research and academic inquiries and aims to strengthen the ‘community of knowledge’, specifically in terms of the adaptive capacity of coastal urban and peri-urban Indigenous Peoples to climate change. The chapter draws from a study undertaken under the auspices of National Climate Change Adaptation Research Facility’s (NCCARF) *National Climate Change Adaptation Research Plan for Indigenous Communities* (NARP) (Langton et al. 2012). That NARP identified five broad categories of information necessary to enhance decision-making about climate change adaptation for Indigenous Australians, namely: (1) the sensitivity and exposure of Indigenous individuals, households, communities, businesses and institutions to climate risks; (2) the vulnerability and adaptive capacity of Indigenous individuals, households, communities, businesses and institutions to climate change; (3) extreme weather events and emergency management planning for Indigenous communities; (4) indigenous population movement, displacement, community relocation, and severe climate variation; and (5) climate change adaptation and Indigenous biodiversity management.

The research addressed the NARP’s Priority Research Topic 5 which specifically sought to “understand the capacity of Indigenous individuals, households, businesses and institutions to adapt to climate change and the identification of strategies to enhance this capacity” (Langton et al. 2012: 5). Consequently, the research aimed to provide a preliminary examination of south-eastern Australian coastal urban and peri-urban Indigenous peoples’ vulnerability to, and capacity for climate change adaptation (CCA). This was achieved through a collaborative research approach whereby the researchers worked with five case study Aboriginal organisations to explore a number of relevant climate change futures with the intention of identifying a preliminary set of strategies to enhance their capacity to adapt to climate change. In response to the project’s 1 year timeframe, the research was designed to establish a framework, processes and procedures that could evolve into a longer and more comprehensive research agenda at some future time.

The research's spatial focus was the 'peri-urban' regions which refers to the fringing landscapes adjacent to the edge of an urban area into which it expands or influences ('peri': around, about or beyond) (Buxton et al. 2006). These areas have experienced unprecedented rapid growth and have been defined as "the urbanized edges of cities plus the spaces into which they expand, both physically and functionally" (Burnley and Murphy 1995: 245).

However, in the context of different Indigenous groups' languages and cultures including their, beliefs and customs, reference to spatial dimensions is in the context of the notion of 'country'. In this sense, 'country' refers to Aboriginal or Torres Strait Islander people's traditional affiliation and responsibility for lands and waters which they collectively refer to as their 'country'. The responsibility to look after or 'care for country' is accepted by all levels of Indigenous society, individuals, family groups as well as the clan. Deborah Bird Rose (1996) explains 'country' as:

People talk about country in the same way that they would talk about a person: they speak to country, sing to country, visit country, worry about country, feel sorry for country and long for country ... country knows, hears, smells, takes notice, takes care, is sorry or happy ... Because of this richness, country is home, and peace; nourishment for body, mind and spirit; heart's ease (Rose 1996: 7).

27.2 Urban and Peri-Urban Indigenous Communities

The significance of the urban and peri-urban focus for this study lies in the fact that most Indigenous Australians live in urban or regional parts of the country. Biddle (2012) notes that in 2006, some 74.5 % of Indigenous Australian's lived in a major city or regional centre. The Australian Bureau of Statistics records some 43 % of Australia's Indigenous population residing in an urban centre (Australian Government 2010: 106). Increasingly, Australia's Indigenous population is becoming more urban and this pattern is likely to continue over the next few decades (Biddle 2012: 18). For example, projections by Biddle and Taylor (2009) suggest that Australia's Indigenous population residing in its major cities will increase by 34.0 % between 2006 and 2016 compared to 8.8 % for the Indigenous population in very remote areas.

The significance of the urban and peri-urban focus is further reinforced by Dugdale (2008) who has reported that in 2006 in Queensland, 24 % of the state's Indigenous population lived in the City of Brisbane municipality and 32.4 % lived in the essentially peri-urban South East Queensland (SEQ) region centred on Brisbane City.

Whilst conventional Indigenous research has tended to focus on traditional Aboriginal communities of remote and central and northern Australia, these residential facts highlight the importance of understanding the majority of Indigenous people, i.e. those residing in urban and peri-urban locations. Of note is a key difference between coastal urban and peri-urban Indigenous people and those residing in semi-arid, arid and tropical communities in northern Western Australia, Queensland and the Northern Territory. In essence, the former do not live in discrete

Indigenous communities and tend to be generally integrated into the wider urban and peri-urban community, i.e. the majority of urban and peri-urban Aboriginal people live ‘off-country’. This fact had important methodological implications for the research engagement with the case study organisations.

27.3 Project Methodology

The research project adopted a case study approach and engaged with key representatives from Indigenous organisations in five case study locations in three Australian states. They included Elders, chief office bearers of Aboriginal organisations and knowledgeable people who could present the position of their communities. Over the 12 months available for the research, two series of case study specific meeting-like workshops were undertaken in each case study to introduce, discuss and understand stakeholder capacity as individuals, households, businesses, and institutions to adapt to climate change. A limited number of selected interviews were also undertaken to follow up a number of themes that emerged from the workshops.

The first series of workshops exposed the participants to the climate science through the use of one-page summaries in the form of “Climate Storylines” for each region. This information facilitated the identification and discussion on expected impacts and landscape changes that need to be considered in the future. The second series of workshops provided opportunities to identify and to commence to scope out strategies to enhance participant’s capacity to adapt to future climate change. As the study progressed through its various stages, the research team sought constant feedback and confirmation of reported findings and minutes of meetings from the participating Aboriginal organisations and their representatives.

27.3.1 Indigenous Case Studies

Five coastal peri-urban case study areas across south-eastern Australia were identified through discussions and agreements with five autonomous Indigenous community organisations that were engaged from the outset of the project proposal. The participating Indigenous organisations included:

- (i) **Kurna Nation Cultural Heritage Association Inc.** of the Adelaide Plains – an urban Indigenous group within the Adelaide metropolitan region that was involved in recent strategic planning place-making expression activities and workshops. Kurna country.
- (ii) **Wathaurong Aboriginal Co-Operative Limited** at North Geelong – a community-based organisation providing Indigenous people within the Greater Geelong and surrounding areas with access to health, housing, education, employment and heritage services. Wathaurong/Wathaurung/Wada Wurrung country.

- (iii) **Boon Wurrung Foundation Limited** in conjunction with the Mornington Peninsula Shire, Victoria (Melbourne City to Wilsons Promontory) – an urban/peri-urban Indigenous group on the south-east fringe of Melbourne experiencing extensive coastal urban sprawl and attempts by the (former) Victorian state government to enable increased sprawl into previously designated green belt areas within their ‘country’ that directly impact upon their cultural and natural environmental responsibilities. Boon Wurrung/Bunerong country.
- (iv) **Quandamooka Lands Council Aboriginal Corporation** Stradbroke Island (Minjebrah) Moreton Bay, South East Queensland – a peri-urban Indigenous community that experiences major seasonal visitation impacts associated with their proximity to the Brisbane metropolitan region. At the time of this study, the State and local governments were undertaking a major land use planning study for North Stradbroke Island which involved the Quandamooka community and their 2011 awarded native title lands. Many members of this community reside and work off country in the Brisbane metropolitan area. Quandamooka country.
- (v) **Jagera Ganay-Magil Aboriginal Corporation** in the Brisbane-Ipswich region – comprises and represents several urban and peri-urban Indigenous groups within the Brisbane-Ipswich metropolitan region. Jagera Ganay-Magil country.

The location of the five case study communities are shown on Fig. 27.1. A summary of the generic characteristics of each of the five case studies and their respective organisation is provided in Table 27.1.

27.4 Climate Change Projections and Aboriginal Country

Climate science comprises an evolving field of knowledge and is marked by uncertainties (Reilly and Schimmelpennig 2000; Patt et al. 2005). This is particularly the case of future climate change projections specific to smaller scale areas such as defined native title areas. Drawing on the latest available climate science knowledge, Table 27.2 presents an overview of how climate change is likely to impact the three regions containing the five case studies, namely the Adelaide Plains, Southern Victoria and South East Queensland. Detailed projections and information for each region and case study area were contained in specific climate storylines and impact maps that were employed in workshops during the course of the research with the case study communities.

The literature highlighted that climate change impacts are expected to affect cities and regions differently (Füssel 2007). Additionally, there is no uniformity across individuals, groups within society, organisations and governments in terms of their adaptive capacity and how they can respond to current and future climate change impacts (Vincent 2007). Consequently, adaptation will need to occur at, and be specific to, various scales from local through to regional and national (Adger 2005).

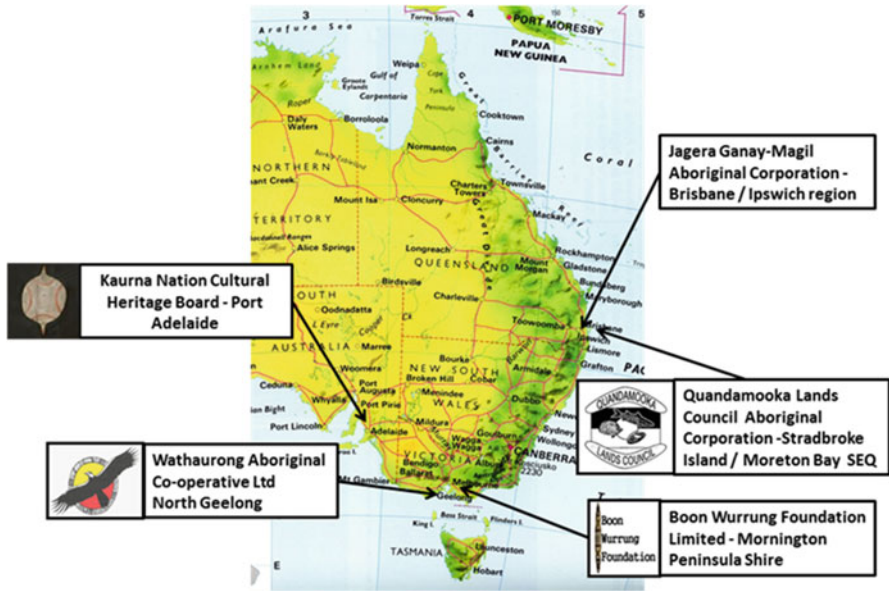


Fig. 27.1 Location of indigenous case study communities

Climate change is expected to have social, economic and environmental impacts on urban and peri-urban Indigenous communities inhabiting coastal areas throughout south-eastern Australia. These impacts include a loss of community and environmental assets, including cultural heritage sites, with significant impact on the quality of life of populations inhabiting these areas, and the establishment of potential favourable conditions for the spread of plant diseases, weeds and pests. Over most of south-eastern Australia, including southern Victoria and the Adelaide region, climate change is expected to lead to increased risk of heatwaves, longer drought periods, increased bushfire risk, increased risks of flood events and more frequent coastal inundation and associated impacts such as coastal erosion.

A review of the literature examining the impacts of climate change on peri-urban and urban Indigenous people found that there is limited research on the topic in Australia and globally. The review did show that lower socio-economic members of this group are more vulnerable to climate change compared to the general Australian population. Their adaptive capacity is low as a result of the same systemic issues confronting Indigenous people that have led to disadvantage. As such, research on climate change adaptation positions climate change as one of the many issues facing Indigenous people and needs to be addressed collaboratively and not in isolation. Research from other more remote regions in Australia and abroad indicate collaborative community-based approaches are needed for effective climate change vulnerability assessments and the building of individual and collective adaptive capacity.

Table 27.1 Summary of generic characteristics of the case studies

	Case study organisational name				
Generic characteristics	Kaurna National Cultural Heritage Association Inc.	Wathaurong Aboriginal Co-Operative Ltd	Boon Wurrung Foundation Ltd	Quandamooka Lands Council Aboriginal Corporation Inc.	Jagera Ganay-Magil Aboriginal Corporation Inc.
Country: geographical location and scope	Adelaide plains	Geelong and Barwon Region, south-west of Melbourne	Southern Melbourne to Wilsons Promontory including the Mornington Peninsula	Moreton Bay and North Stradbroke Island region east of Brisbane	Brisbane – Ipswich metropolitan areas
Corporate status	Incorporated with an aim of cultural heritage custodianship and referral	Co-operative with an aim of employment, social and health provision for Indigenous residents	Limited company serving as a spokesperson for the Boon Wurrung	Incorporated with an aim of cultural heritage custodianship and referral	Incorporated with an aim of cultural heritage custodianship and referral
Legal status	Advisory referral service	Advisory referral service; not a Registered Aboriginal Party (RAP)	Advisory referral service; not a Registered Aboriginal Party (RAP); application made	Quasi-local government entity arising from a successful Native Title claim	Advisory referral service
Urban characteristics	Urban and peri-urban Adelaide Plains metropolitan context	Urban and peri-urban Geelong metropolitan context	Urban and peri-urban southern Melbourne metropolitan context	Peri-urban Moreton Bay regional context	Urban and peri-urban Brisbane - Ipswich metropolitan context
Geographical characteristics	Plains landscape adjunct to the Gulf St Vincent	Rolling plains landscape adjunct to Port Philip Bay and the Bellarine Peninsula	Mixed environment from coastal to swamps to farmlands to national parks	Coastal and riverine landscapes including major islands	Mixed environment from coastal to swamps to farmlands to riverine plains

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Table 27.2 Comparative summary of climate change variables for each case study region

		Case study organisation				
Climate change variables	Vulnerability Rating (CSIRO 2007; Suppiah et al. 2007)	Kaurna National Cultural Heritage Association Inc.	Wathaurong Aboriginal Co-Operative Ltd	Boon Wurrung Foundation Ltd	Quandamooka Lands Council Aboriginal Corporation Inc.	Jagera Ganay-Magil Aboriginal Corporation Inc.
	Temperature changes	Medium	Medium	Medium	Hot spot	Hot spot
	Av temps increased by 1.2 °C since the 1950s (Suppiah et al. 2006); increase of 0.8 °C by 2030 and 2.3 °C by 2070 (Department of Environment and Natural Resources 2010)	Av an temps likely to increase by 0.5–1.1 °C by 2030 and 0.9–3.5 °C by 2070 (Kinrade and Preston 2008)	Av an temps likely to increase by 0.5–1.1 °C by 2030 and 0.9–3.5 °C by 2070 (Kinrade and Preston 2008)	Av an temps likely to increase by 0.5–1.1 °C by 2030 and 0.9–3.5 °C by 2070 (Kinrade and Preston 2008)	Increase of 0.4 °C in the av temp; increase between 0.5 and 1.5 °C projected by 2030 (Suppiah et al. 2007; Department of Environment and Resource Management 2009)	Increase of 0.4 °C in the av temp; increase between 0.5 and 1.5 °C projected by 2030 (Suppiah et al. 2007; Department of Environment and Resource Management 2009)
Rainfall changes	Decline in an av of 4.5% by 2030 and 15% by 2070, greatest decline in winter and spring (8%) (Department of Environment and Natural Resources 2010)	Decrease in an av an rainfall by up to 8% by 2030 and 23% by 2070, higher reductions expected in winter and spring (Kinrade and Preston 2008)	Decrease in an av an rainfall by up to 8% by 2030 and 23% by 2070, higher reductions expected in winter and spring (Kinrade and Preston 2008)	Decrease in an av an rainfall by up to 8% by 2030 and 23% by 2070, higher reductions expected in winter and spring (Kinrade and Preston 2008)	Decline by almost 55 mm per decade observed since 1950 (Gallant et al. 2007)	Decline by almost 55 mm per decade observed since 1950 (Gallant et al. 2007)

Rainfall events	More extreme rainfall events expected (Suppiah et al. 2006; Murphy and Timbal 2008)	Increase of up to 25% in extreme rainfall events of 1–24 h in duration in at-risk areas by 2030 and up to 70% by 2070 (Kinrade and Preston 2008).	Increase of up to 25% in extreme rainfall events of 1–24 h in duration in at-risk areas by 2030 and up to 70% by 2070 (Kinrade and Preston 2008).	Extreme rainfall events likely to increase across region; an increase of up to 25% in the intensity of 1-in-20 year daily-rainfall event (Abbs et al. 2007; Hennessy 2004).	Extreme rainfall events likely to increase across region; an increase of up to 25% in the intensity of 1-in-20 year daily-rainfall event (Abbs et al. 2007; Hennessy 2004).
Flooding and wind events	Not available	Potential increase in frequency or magnitude of flood events or flood heights (Kinrade and Preston 2008)	Potential increase in frequency or magnitude of flood events or flood heights (Kinrade and Preston 2008)	Moderate thunderstorm activity averaging between 20 and 40 days per year (Hennessy 2004).	Moderate thunderstorm activity averaging between 20 and 40 days per year (Hennessy 2004).
Coastal risks (storm surges and erosion)	More intense storm events as well as higher coastal storm surges (Suppiah et al. 2006)	Greater exposure to storm surge inundation - expected change from current 1 in 100 year to 1 in 1–1 in 4 year event by 2070 (Kinrade and Preston 2008)	Greater exposure to storm surge inundation - expected change from current 1 in 100 year to 1 in 1–1 in 4 year event by 2070 (Kinrade and Preston 2008)	Sea-level rise, projections indicate a rise of approximately 80 cm by 2100 (Parry et al. 2007)	Sea-level rise, projections indicate a rise of approximately 80 cm by 2100 (Parry et al. 2007)
Evaporation (CSIRO 2007)	Increased potential evaporation and reduction in relative humidity leading to drier conditions	Increased potential evaporation and reduction in relative humidity leading to drier conditions	Increased potential evaporation and reduction in relative humidity leading to drier conditions	Increased potential evaporation and reduction in relative humidity leading to drier conditions	Increased potential evaporation and reduction in relative humidity leading to drier conditions

(continued)

Table 27.2 (continued)

	Case study organisation				
Climate change variables	Kaurna National Cultural Heritage Association Inc.	Wathaurong Aboriginal Co-Operative Ltd	Boon Wurrung Foundation Ltd	Quandamooka Lands Council Aboriginal Corporation Inc.	Jagera Ganay-Magil Aboriginal Corporation Inc.
Bushfire events	Increase frequency and intensity of extreme fire weather days; longer fire seasons and reduced number of days suitable for controlled burning (Lucas et al. 2007)	Worsening fire weather conditions expected with an increase in the number of days of 'very high' or 'extreme' forest fire risk by 1–2 days by 2030 (Lucas et al. 2007)	Worsening fire weather conditions expected with an increase in the number of days of 'very high' or 'extreme' forest fire risk by 1–2 days by 2030 (Lucas et al. 2007)	Increase in av mean temp and severe weather events (eg extended drought); could also lead to more favourable conditions bushfires (Hennessy 2004)	Increase in av mean temp and severe weather events (eg extended drought); could also lead to more favourable conditions bushfires (Hennessy 2004)
Hot days and frost days	Increase in the frequency of extremely warm days (above both 35 and 40 °C) and nights along with a decrease in the frequency of extremely cool days and nights (McInnes et al. 2003)	Increase in extreme hot days (temp above 35 and 40 °C) and decrease in the number of frost days (City of Greater Geelong 2011; Department of Sustainability and Environment 2008)	Increase in extreme hot days (temp above 35 and 40 °C) and decrease in the number of frost days (City of Greater Geelong 2011; Department of Sustainability and Environment 2008)	Increase in mean temperatures will also increase the number of days over 35 °C in the region (Suppiah et al. 2007; Department of Environment and Resource Management 2009)	Increase in mean temperatures will also increase the number of days over 35 °C in the region (Suppiah et al. 2007; Department of Environment and Resource Management 2009)

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The SEQ region has been identified as a climate change vulnerability 'hot spot' due to on-going population growth and the location of urban development along its low-lying coastline and floodplains (Hennessy et al. 2007). While there is much uncertainty surrounding current climate science, models have shown that SEQ will be affected by changes in climatic averages, including rainfall and temperature, sea-level rise and an increase in extreme weather events. Resultant impact could include greater evaporation and decreased rainfall causing increased pressure on water supplies; potential favourable conditions for the spread of plant diseases, weeds and pests; increased coastal flooding and erosion due to sea-level rise and storm surges with subsequent damage to infrastructure and building structures; increase in heat related illness; and increased risk of tropical cyclones reaching the region (Queensland Climate Change Centre of Excellence and Department of Environment and Resource Management 2010).

In Southern Victoria climate change impacts are expected to have major effects upon the region and Wathaurong country because of its grassland, heathland, low saline coastal plains and deeply incised coastal fringes. Likely impacts include more frequent coastal inundation, increased coastal erosion impacts, increased bushfire risk, increased flood events risks, more frequent heat wave events, and longer drought periods (Roös 2013).

For the Adelaide Region the anticipated climate change impacts include increases in average temperatures, decreases in rainfall, increases in potential evapotranspiration, decreases in relative humidity and sea-level rise. This is expected to lead to increased risk of heatwaves, longer drought periods, increased bushfire risk and coastal hazards, including storm surges, coastal erosion and inundation.

27.5 Key Issues

27.5.1 General

The first series of workshops considered the most significant implications of climate change for the participant's organisations, themselves and their community members. This resulted in the emergence of a number of consistent themes from across the five case study groups, namely: (i) Indigenous representation; (ii) housing; (iii) employment; (iv) environmental and cultural assets; and (v) wild food network. These five themes were subsequently defined as follows:

Indigenous Representation refers to the opportunities for, and capacity of, Indigenous people to represent their interests and concerns in climate change meetings, decision-making forums and policy documents that are largely controlled by various tiers of government. This also relates to the availability of individuals who are capable of representing their community's interests in such forums and discussions.

Housing clearly identified by all workshop participants as a key theme for the consideration of CCA for urban and peri-urban Aboriginal and Torres Strait Islander peoples. It includes a category of issues related to the ability of Aboriginal people to either move or modify their existing housing to mitigate the effects of climate change. It also concerns the degree to which Aboriginal people can engage in energy and water saving schemes for CCA. All participants noted the large numbers of Aboriginal people from their communities who were reliant on public housing.

Employment concerns the negative aspects of job loss due to changing employment prospects through climate change and also included the positive aspects of job creation in industries involved in CCA and mitigation, such as carbon-trading and sequestering schemes and revegetation programs.

Environmental and Cultural Assets includes those connected to land managed by Aboriginal people as well as on-country not directly accessible to Aboriginal people. It includes cultural sites containing burials and archaeological materials, as well as native title areas, Indigenous-run farms, areas connected to fishing and hunting licences and national parks for which there are joint management agreements.

The Wild Food Network includes those concerned with the cultural and economic importance of Aboriginal people being engaged in the native bush food industry, particularly with wild harvesting, growing, processing, value adding, catering and spin-off guiding/talking businesses.

Drawing from the first round of community consultations a composite view has been developed of how the key issues were perceived across the case studies at the individual, household, business, and institutional levels (see Table 27.3).

Table 27.3 Composite matrix of CCA themes for case studies

	Indigenous representation	Housing	Employment	Environmental and cultural assets	Wild food network (indigenous)
Individuals	1, 2, 3, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 4, 5	2, 3, 4, 5
Households	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5	2, 4, 5	2, 4, 5
Businesses	2, 4, 5	2	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5
Institutions	1, 2, 3, 4, 5	2, 4, 5	2, 3, 4, 5	1, 2, 3, 4, 5	2, 3, 4, 5

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KEY:

1. Kaurna Nation Cultural Heritage Association Inc (Adelaide Plains region)
2. Wathaurong Aboriginal Co-Operative Limited (North Geelong region)
3. Boon Wurrung Foundation Limited (Melbourne City to Wilsons Promontory region)
4. Quandamooka Lands Council Aboriginal Corporation (Stradbroke Island/Moreton Bay SEQ region); and
5. Jagera Ganay-Magil Aboriginal Corporation (Brisbane-Ipswich region)

27.5.2 Indigenous Representation

An analysis of existing State and regional policy plans, strategies etc. (covering land use and growth management, natural resource management, state and regional climate change adaptation) revealed that none contained any conscious effort to link climate change adaption policy or initiative with Indigenous Groups or Traditional Owners. Nor did these documents contain any specific Indigenous Climate Change (Adaptation) Policies and it appears that Indigenous people were not consulted in the preparation of these documents. These findings support similar conclusions from previous studies (Salik and Ross 2009). It was recognised however, that opportunities do exist to forge future links between climate change adaptation policy initiatives and Indigenous communities, including those communities constituting the case studies.

In summary, there was consistent recognition across the case study organisations that climate change is currently placing a disproportionate burden upon Indigenous people. This arises directly from the physical impact to sensitive areas (i.e. threat of fires, erosion etc.). More indirectly, Indigenous people who reside in urban/peri-urban areas of south-eastern Australia are highly vulnerable to climate change and climate change policies because of the wider perception that they are generally dependant on the same resources as non-Aboriginal people and that they possess less links to traditional country. As a strategy to overcome these challenges, there should be a collaborative approach to CCA, which builds-in traditional knowledge so that it does not undermine cultural identity. CCA with Indigenous communities in south-eastern Australia cannot be divorced from connection to country.

27.5.3 Housing

In most regions in south-eastern Australia, the responsibilities to service Aboriginal housing needs have been transferred from specific Aboriginal organisations to the control of mainstream public housing agencies. Where this has occurred, Aboriginal participants have claimed that it has resulted in less flexible housing conditions. Indigenous people in the public housing system have found it difficult to become involved in 'green' activities. While some tenants have wanted to get involved in waste water recycling, rainwater harvesting, wind power and solar panel installation, their tenancy agreements have effectively impeded this. In the past, when Aboriginal homes in Adelaide were managed by the Aboriginal housing funded unit, the community had access to funds which would have allowed them to engage in such activities. Within mainstream public housing there are no incentives to encourage tenants to spend their own money to make home improvements. The situation on North Stradbroke Island is different, with the more flexible practices of the Quandamooka Housing Co-Operative allowing residents to reclaim some benefits for improving their rented homes.

While it is difficult to obtain figures on recent movement patterns that are specific to certain Aboriginal communities, the overall pattern is for Indigenous peoples' migration towards major cities (Biddle 2012; Biddle and Yap 2010). The driving factors identified that were behind Aboriginal movements into and within south-eastern Australia were the availability of jobs and cheaper housing. It was predicted that future alterations to existing land values and land uses, perhaps exacerbated by climate change, are likely to affect Indigenous residency patterns surrounding the cities.

27.5.4 Employment

Negative impacts to country are highly likely to affect Indigenous people who are currently involved in industries based on their access to natural resources, such as fishing and shell fish collecting as on North Stradbroke Island. There was also concern that rising energy costs might affect the growth of their businesses, such as the glass crafts produced by the Wathaurong Aboriginal Co-Operative. On the positive side, CCA could offer Aboriginal people opportunities for greater involvement in land and sea care programs. For instance, the Boon Wurrung Foundation aspire to having Indigenous 'rangers', modelled on the sea ranger program in the Northern Territory, established within the Port Phillip Bay region. The Wathaurong Aboriginal Co-Operative is planning to link community training in land care programs with their management of their *Wurdi Youang* property. Quandamooka people have been employed in the national parks of North Stradbroke Island. The Jagera Ganay-Magil Aboriginal Corporation participants stated an interest in developing 'looking after country' type roles, particularly in native plant propagation, national park management and the wild food industry. The Kurna community has similar aspirations with the development of ecotourism ventures, possibly through the Warriparinga Living Kurna Centre. With greater inclusion in caring for country programs, Indigenous people will have more employment opportunities for individuals and be able to develop investment strategies for their businesses and organisations.

27.5.5 Environmental and Cultural Assets

Two of the case study communities are amongst a small number of Aboriginal communities in south-eastern Australia that have access to large portions of land. The Wathaurong Aboriginal Co-Operative is currently managing a 800 ha Kangaroo Grass (*Themeda australis*) grassland property, *Wurdi Youang*, which is situated near the You Yangs. The Co-Operative is seeking to have the land declared as an Indigenous Protected Area (IPA) in order to gain access to federal government resources to help undertake biodiversity and cultural resource conservation actions. On North Stradbroke Island in SEQ, the Quandamooka people have access to land

through native title that would potentially enable them to engage in CCA-related businesses. The Jagera participants stated that they had difficulty in receiving funding from the Indigenous Land Corporation as they 'were people still without country'. Without land, the Jagera community experiences difficulties in determining what training young people required. With access to land, a future business plan could include their involvement in 'green industries', such as carbon farming.

In terms of cultural heritage management, senior members of Aboriginal communities are often involved with local heritage assessments, although it was stated that Indigenous consultations generally took place at the end of the process, which was not ideal. Proactively, cultural heritage management plans, incorporating CCA considerations, need to be used to protect sites containing stone artefacts, midden material and burials. There was universal agreement that an Indigenous perspective in holistically managed country is required for CCA. It was also noted that by not recognising the long held traditions of Aboriginal caring for country, European practices of land development were putting people at risk to natural hazards such as cataclysmic fires, floods etc. which in turn was putting their cultural assets at greater risk.

Participants of all five communities wanted greater recognition of Dreaming sites as cultural places to conserve. An example of sites at risk from climate change was the Tjilbruke sites, which are linked by a Dreaming Track that runs along the coast on the Gulf St Vincent side of Fleurieu Peninsula from the vicinity of Adelaide to Cape Jervis and inland to Brukunga near Mount Barker (Clarke 1996; Tindale 1987). In local Aboriginal society, Tjilbruke created many topographical features, particularly freshwater springs along the coast, before finally turning into a Glossy Ibis (*Plegadis falcinellus*). The Dreaming Track was important for redistributing goods and the transference of knowledge through trade. Climate change concerns extend to the Tjilbruke sites (many of them coastal springs – 'tears flowing from Tjilbruke') disappearing through a combination of the sea level rising and urban development.

The Wathaurong Aboriginal Co-Operative on the other hand believe that as the Wurdi Youang stone arrangement on their Wurdi Youang property appears to be based on the local Aboriginal calendar, it maybe a useful tool to explore the impacts of past climate change. Since climate change affects country, Indigenous participants considered it important that they develop a voice in the future debates concerning CCA. The Kurna community have long held aspirations of establishing the Warriparinga Living Kurna Cultural Centre, located on land within the Tjilbruke site in suburban Marion, as a means of communicating Indigenous environmental issues to the general public. They further argued that the Centre should become the public face of CCA for the whole state and that it should be framed using Indigenous ecological knowledge. Similar aspirations were expressed by Boon Wurrung participants who saw opportunities potentially stemming from the close partnership that the Boon Wurrung Foundation Limited has formed with the Port Philip EcoCentre at St Kilda.

There was general recognition of the importance of exhibitions in museums, interpretation centres and keeping places as a means of developing the awareness of

the distinctiveness of Aboriginal cultures. An Indigenous perspective on the environment is useful for drawing attention to the short and long term changes to the environment. Senior members of many Aboriginal communities in south-eastern Australia see themselves as having a continuing role in caring for country, as did their ancestors. This is reflected in their ceremonial ‘welcome to country’ speeches made on official occasions.

27.5.6 Wild Food Network (Indigenous)

Under a variety of climate change scenarios, changes in timing of flowering and breeding cycles, coupled with higher temperatures and lower rainfall plus the likelihood of potential favourable conditions for the spread of plant diseases, weeds and pests, would impact negatively on the wild food network and various individual and collective activities operating at all nodes along this network (Fig. 27.2).

Interestingly, 9 of the 13 plant species which grower associations and government agencies consider as the mainstay of the Australian native food industry (Hele

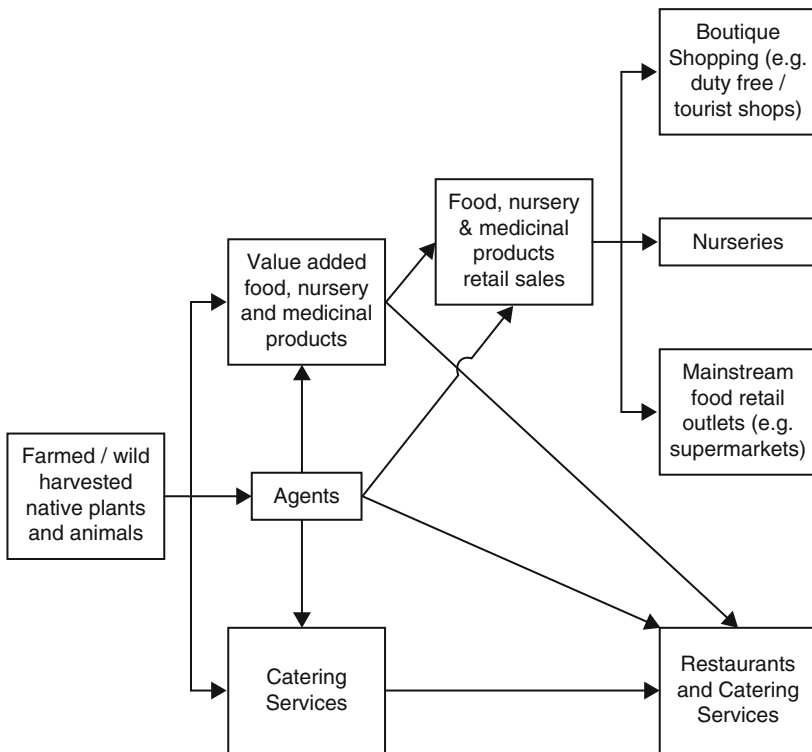


Fig. 27.2 Wild food (indigenous) network

2003; Ryder and Latham 2005; Ryder et al. 2009), are grown in south-eastern Australia. Indigenous people generally operate at the food service and tourism nodes of the network, with some wild bush harvesting and attempts at developing 'bush food gardens' as plant nurseries (Robins 2007).

The study engaged with a small number of single successful Indigenous operators in the wild food network. Universal aspirations were expressed by all case study organisations to develop businesses in this area and become involved in the wild harvesting or growing of plants as raw materials to help revitalise their hunter-gatherer crafts. In this latter regard, it is feared that the vegetation supporting some of these practices such as species of sedges and grasses used in basket making, may be threatened by climate change. The 'cultural authenticity' that Indigenous involvement brings to the whole bush food industry is recognised as significant for developing the market (Robins 2007). The industry has opportunities for small operators, as well as for larger community-run organisations. For example, Wathaurong Aboriginal Co-Operative have aspirations to develop businesses involved in the growing of bush foods, initially as suppliers and agents for high quality local restaurants that understand the benefit in promoting locally grown 'Aboriginal' produce.

The wild plants and animals have cultural importance in contemporary identity building that transcends their economic importance. Whilst there are opportunities to develop on-country tourism initiatives that incorporate bush foods and the environment as major themes, there are also strong beliefs amongst Aboriginal communities that their wellbeing was improved by the consumption of their 'traditional' foods and by their use of 'bush' medicines.

27.6 Discussion

In response to likely climate change and urbanisation impacts and landscape changes confronting their respective regions, urban and peri-urban Indigenous people consider themselves highly vulnerable largely because they do not possess strong links to traditional country, which places them at a disadvantage when attempting to participate in CCA forums. Clearly their adaptive capacity could be improved if they had enhanced access to their country. In their current circumstances they noted the significant difficulties they faced in influencing CCA at individual and family levels and in business and institutional settings. An acute shortage of qualified and experienced members further exacerbates their ability to engage in climate change debate and policy formulation. Thus there is an urgent need to ensure that the next generation of Aboriginal communities is across CCA and other environmental management issues related to country.

Due to their limited standing in urban and peri-urban environments, Aboriginal people's lack of resources, their limited access to their country, and their perceived powerlessness to influence the negative aspects of urbanisation and landscape changes, their attention to climate change impacts and adaptation tends to repeatedly take them back to considerations of social and economic equity and opportuni-

ties for improvement. Ongoing historical disadvantage leads to socio-economic issues overriding CCA considerations. There was a clear call for future serious considerations of CCA matters not to be divorced from the social and economic disadvantage of Indigenous people as their long standing economic and social aspirations are seen as fundamental survival strategies for their communities.

Whilst economically important, wild plants and animals have cultural significance in contemporary identity building. The exploitation of the wild food network presents important opportunities for urban and peri-urban Aboriginal people, such as the development of on-country tourism initiatives focused on bush foods and the environment. Perhaps more important is the strong belief held by Aboriginal communities that consumption of their 'traditional' foods and their use of 'bush' medicines significantly improves their wellbeing.

As a strategy to overcome the noted challenges, there should be a collaborative approach to CCA, which builds in traditional knowledge so that it does not undermine cultural identity. CCA with Indigenous communities in south-eastern Australia cannot be divorced from connection to country. Since climate change affects country, Indigenous people consider it important that they develop a voice in future debates concerning CCA. The ILUA process may provide opportunities to address CCA in a more formal and comprehensive manner. Future ILUAs should take the opportunity to address CCA relevant to urban and peri-urban Aboriginal people and provide resources to facilitate their adaptation requirements. This should lead to more meaningful engagement that maximises the gains from existing and emergent ILUA processes through the embedment of climate change adaptation intentions and support commitments along with serious employment of protocols in the ILUA process. All of these initiatives should lead to meaningful and higher order engagement by urban and peri-urban Indigenous communities in formal climate change adaptation policy agendas.

27.7 Conclusions

The evidence emerging from this research clearly demonstrates that Aboriginal people's consideration of the future, even with the overlay of climate change and the requirements for serious considerations of adaptation, are significantly influenced and dominated by social and economic aspirations which are seen as fundamental survival strategies for their communities. This is largely because many other initiatives can be linked and/or run in parallel with climate change adaptation initiatives which can start to address some long standing issues of a socio-economic and human capacity nature.

The recommended collaborative and comprehensive approach involves a high degree of inclusive participation and youth engagement which should lead to greater Indigenous connection to country, thus improving the chances of enhancing the adaptive capacity of individual and collective Indigenous people.

In summary, there was universal recognition that climate change was placing a disproportionate burden upon Indigenous people. Circumstances contributing to this unsatisfactory situation included: the lack of specific CCA policy to support Indigenous people and communities; a lack of awareness and understanding of climate change and adaptation options by Indigenous urban and peri-urban people; and their dispossession and absence of direct access to their country. There was an overwhelming position that to adapt to climate change, access to land was important, change had to be seen, and there was a need to understand it.

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