LITERATURE REVIEW

CLIMATE CHANGE AND INDIGENOUS COMMUNITIES

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Understanding Climate, Adapting to Change: Indigenous community understandings of climate and future climate change impacts in North Qld.

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Introduction

The world faces considerable environmental challenges from the effects of climatic change in the future. Indigenous people are likely to be among the most vulnerable to the effects of climate change (Parry et al 2007), with major impacts to indigenous natural and cultural landscapes. Under modest predictions, sea level rise alone is expected to affect thousand's of coastal Aboriginal archaeological sites in Australia (McIntyre-Tamwoy 2007:7).

A project was developed by James Cook University researchers[1] to introduce the 'climate change conversation' to two indigenous communities in north Queensland. A collaborative project was developed between James Cook University, Injinoo community[2] and Girringun Aboriginal Corporation[3] on indigenous perceptions of climate change. The project included workshops with representatives from the Injinoo and Girringun communities to identify what people valued in the environment, what changes had been observed in the environment and to discuss the scientific predictions of climate change in each discrete geographical area. This report is the literature review that provides context for the topic.

Four primary themes emerged from the literature review

1. Vulnerability and empowerment: there is a perception from some indigenous communities that they powerless victims in the face of climate change, suffering from the actions of developed nations on which they have no influence (Farbotko 2005, 2010). An alternative indigenous perspective is taking responsibility for maintaining environmental balance as a cultural responsibility (Huffman 2009, Sand 2007, Ulloa 2009).

2. Vulnerability models identify indigenous people as some of the most vulnerable people to impacts from climatic change globally (Altman and Jordan 2008).

3. Strategies for dealing with climatic change should be be developed with knowledge of potential impacts at the local level and an understanding of how those potential impacts will affect a particular community. Adaptive strategies can then be developed in collaboration with the local community (eg. CRiSTAL Manual IISD 2009).

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[1] The primary researchers are Dr Susan McIntyre-Tamwoy and Dr Maureen Fuary.
[2] Injinoo community represents Gudang traditional owners from Cape York, Queensland.
[3] Girringan Aboriginal Corporation represents 9 traditional owner groups (Bandjin, Djiru, Girramay, Gugu Badhan, Gulnay, Jirrbal, Nywaigi, Warrgamay and Warungnu) from the Wet Tropics of north Queensland .

4. In Australia there are current collaborative climate change projects between researchers and indigenous communities, most notably on sea level rise in the Torres Straits (Green 2006a; 2006b; Green et al 2009a) and fire abatement in Western Arnhem Land (Barnsley and NAILSMA 2009).

Review of the current literature on the topic included published peer reviewed papers and unpublished reports available via the internet. An Annotated Bibliography of 48 references is attached. As part of the literature review an Endnote Library of 213 references was produced.

Arctic and Pacific nations

Arctic communities and Pacific island nations are the 'canaries in the coalmine' for climate change (Ford el at 2006; Farbotko 2010). As the ice caps melt and sea levels rise, it is the indigenous communities that rely on glacial and tropical marine environments that are experiencing the most dramatic changes.

In the Arctic, Watson (2010) reports that traditional hunters such as Jerry Akoaksion, have observed thinner ice and faster melting pack ice. Observations documented by Riedlinger include late freeze up of ice, changes to 'drinkable ice', more frequent storms and less clear days "when you can hear the ice crack" (1999:430-1). These changes have meant that Arctic hunters have had to adjust the timing of their seasonal hunting calendar, stay on the ice for shorter periods of time, use all weather vehicles and access the sea at different locations (Berkes 2001). Climatic changes have meant that fish are harder to catch, there are fewer musk-ox and caribou whose migration is affected by shorter freeze ups in the ice sheet (Riedlinger 1999) and whose food source, lichens and other vegetation, are covered with ice by the freezing rains when the cold sets in (Watson). Natural resources are highly significant to many Indigenous people around the world, providing food and kudos through traditional practices such as hunting. Jerry Akoaksion, veteran hunter from Ulukhaktok says "Part of being Inuk is your hunt. That's central to your identity, self-esteem, confidence and self worth" (Watson 2010). As a result Arctic hunters are taking more personal risks, resulting in increased accidents from unstable ice such as bogged snowmobiles, being stranded on ice break ups and going through the ice (Watson 2010).

In the Pacific Island nations coastal erosion, tidal inundation, salt incursion into freshwater supplies and loss of coral reefs and mangroves and therefore fish stocks are predicted by McMichael et al (2002) as having serious implications. On Boera Island, Bouganville PNG, dry periods where food is scarce, are longer, bore water is turning salty and food gardens are burnt by salt water (Serawe 2007).

Indigenous people in places such as Fiji are using Traditional Ecological Knowledge to adapt to the effects of climate change. Duaewa (2009) reports the decrease in fish stocks at one island community meant Fijian women were travelling further out to sea, and staying out longer, to catch fish. A typical fishing expedition for the family table would take all day. Working with Non Government Organisations such as World Wildlife fund for Nature, the Fijian village reintroduced the traditional practice of I kanakana, where marine gardens, owned by women, are cultivated close to shore. This provides Fijian women much closer and less dangerous access to food resources to feed their families. Women can now get as much fish in 2 hours as it used take all day to catch. The women now have more time to spend in the home, with the family, and potentially working in other economies.

In the Tanna worldview in southern Vanuatu, the cause of a problem can always be traced back to a person, who has responsibility for making and 'fixing' these changes (Huffman 2009). The people of

Tanna Island directly associate climate variances with Westerner's lack of respect for nature and monetary greed (Huffman 2009).

Victims and Empowerment

A key theme emerging from the literature on indigenous people and climate change is the issue of "agency" and responsibility for the environmental changes that have been observed. Some indigenous people see themselves as 'climate change victims', with little agency to effect positive change. Other case studies depict indigenous people as 'empowered' to manage environmental change by developing culturally appropriate responses. The examples given below illustrate two different approaches to how indigenous people are perceived, and perceive themselves in relation to climate change and its impacts.

Island nations in the Pacific have been vocal in their concerns of the effects of climate change. The islands Tuvalu are an example of how climate change is already having a dramatic impact on lifestyles and livelihoods. Martyn (2009) reports that direct impacts from climate change including a small increase in sea temperature can result in coral bleaching and a change in ocean currents. With the death of coral and changes in sea currents, fish that feed on the coral and swim in the ocean currents travel elsewhere in search of food and fishing canoes must travel further and in more dangerous circumstances. Increased coastal erosion and intrusion of salt into groundwater is blamed for the difficulties Tuvaluans face in growing crops, such as the coconut palm, Tuvalu's main economic export, and puluka, the nation's staple root crop, which are contaminated by saltwater intrusion into the pits where they grow (Farbotko 2010).

The Tuvalu government and other Tuvaluan representatives continue to advocate for reduced greenhouse emissions to prevent further climatic changes from endangering the Tuvalu Islands. In 2004, Maatia Toafa, as Acting Prime Minister of Tuvalu, delivered a passionate speech to the United Nations General Assembly describing the anxiety felt by Tuvaluans regarding climate change, and described climate change to "a slow and insidious form of terrorism against Tuvalu" (Toafa 2004).

Tuvaluans are perceived by most of the global community as climate victims, as reflected in media coverage including photographs of the rising tides washing through homes on Tuvalu and desperate pleas by the Tuvaluan government to neighbouring developed countries such as New Zealand and Australia to assist with the relocation of Tuvlauans as their islands disappear under their feet (Farbotko 2005: 279). Farbotko (2005) explains the risk that the Tuvaluans take by portraying themselves as tragic climate change victims, reliant on other nations to rescue them from the rising seas, or to drastically reduce global greenhouse emissions as the only avenue to ensure their ongoing survival. By emphasising words such as 'drowning', 'submerged', 'swamped', 'environmental refugee' to describe Tuvalu an Tuvaluans in Australian media, the alternate construction of Tuvaluans as 'empowered', 'resilient' and 'resourceful' is silenced (Farbotko 2005: 289). Farbotko describes the nation's fate as 'wishful sinking'.

> "Only after they disappear will the islands become an absolute truth of the urgency of climate change, and thus act as a prompt towards saving the rest of the planet" (Farbotko 2010: 47-8)

In contrast, the Kogi (one of four groups of the Tayrowa indigenous people) of Sierra Nevada de Santa Marta (SNSM) in Columbia are implementing strategies to restore the natural balance in the environment as their self-realized cultural responsibility. Kogi people believe the mountains in their traditional lands to

be a microcosm of the Earth, and the Kogi consider themselves to have a global responsibility to manage the Earth on behalf of the world (Huffman 2009; Sand 2007).

Huffman (2009) relates the creation belief of the Kogi, where Haba Galchovang the Great Mother, created the Earth and gave the Kogi the cultural and physical responsibility to manage the SNSM as the 'older brother' (Kogi) on behalf of the 'younger brother' (other people on Earth). Haba Galchovang also warned of the Kasaoggi (interpreted by Huffman as 'us', whose lack of respect for sacred balance and harmony would eventually lead to environmental degradation in the SNSM (Huffman 2009: 29). The Kogi first noticed Haba Galchovang's predicted changes in the 1970's and 80's as snowlines receded, cloud and rain patterns changed and water cycles declined (Huffman 2009; Ulloa 2009). As the 'older brothers' the Kogi felt responsible to alert the rest of the world (the 'younger brothers') to the changes they were observing in the microcosm of Earth. In 1990, the Kogi made a film with BBC filmmaker Alan Ereira, 'Message from the Heart of the World. The Elder Brothers Warning', which was aired on BBC2 in Britain in 1991 and 1992 (Huffman 2009) which aimed to communicate the Kogi message to the global community.

Further environmental changes that have been observed by the Kogi include changes in patterns of wet and dry seasons, deforestation as a result of illegal trade in marijuana and coca, resulting in increased pests and damage to archaeological sites (Ulloa 2009). Kogi believe these changes reflect the imbalance of nature and the cessation of cultural practices.

> "The SNSM is the Heart and centre of the world, and through permanent care, the Mamas (spiritual guides) guarantee the universe's balance…individual and collectivities generate environmental practices through the bounds established by the Mamas within the territory and through the spiritual entities in charge of the resources" (Ulloa 2009:1)

Kogi people aim to regain control of land, natural resources and cultural practices in order to restore the balance of the universe and reverse impacts from climate change. The Kogi believe that asserting traditional and spiritual land management practices is a significant step to restoring environmental degradation and facing the global challenges of climate change (Ulloa 2009:2). Other measures implemented by the Tayrona people include creating relationships with the state of Columbia, pro-actively coordinating pro-indigenous groups in the SNSM and creating an international Fund for the Heart of World that aims to raise funds to recover 837,687 acres of traditional land over 20 years (Sand 2007:2). The Kogi will work with their 'younger brothers' ie. farmers, entrepreneurs and institutions to restore the imbalance of nature (Ulloa 2009:2).

Vulnerability and Adaptation Models

Vulnerability research is important because it provides an understanding of how communities will adapt to impacts from climate change (Adger 1999). Climate change scientists use a number of different models of vulnerability. For Macchi *et al* (2008) the risk of vulnerability is directly affected by the risk of marginalization. Green et al (2009:12-3) uses the concept of vulnerability developed by Allen Consulting Group which identifies vulnerability as a function of exposure, sensitivity and adaptive capacity, with an extensive discussion on how this relates to the Australian indigenous context. Adger identifies two main indicators of vulnerability, social and individual (Adger 1999) and notes that poorer people have fewer

resources to adapt to impacts of climate change (Kelly and Adger 2000). Adger (1999:252) describes social and individual vulnerability as

- Social vulnerability: these are the institutional mechanisms for dealing with impacts from climate change, such as early storm warning systems.
- Individual vulnerability: access to resources and a diversity of income streams.

Entitlement is an important factor in vulnerability and adaptation models. Adger describes entitlement as an underpinning tenet of security and vulnerability (1999:252). Entitlement describes ownership of the problem. Where a problem is defined by outsiders, communities have a reduced capacity to participate in seeking solutions for the problem (Woodward, *et al*.1998), or as Brody *et al* (2008) have found, people who think they can make a positive change are more likely to contribute to making changes. Teka and Vogt (2010) include entitlement, along with willingness and ability, as one of the three main elements to participatory risk management.

One participatory risk management tool developed specifically to provide an understanding of links between climate, livelihoods and specific project activities is CRiSTAL (Community -based Risk screening Tool - Adaptation and Livelihoods). CRiSTAL aims to provide project managers and planners a step-by-step process to

1. Assess the potential impacts of climate on local livelihoods.

2. Assess the sustainability a specific projects with regard to climate change and livelihoods.

3. Integrate changes to the project to facilitate adaptive capacity building within the community for dealing with climate impacts (IISD 2009:1).

CRiSTAL was developed by IUCN (World Convention Union), IISD (International Institute for Sustainable Development), SEI (Stockholm Environment Institute) and Interco-operation, and is available in hardcopy and on the web (www.cristaltool.org), in 4 languages.

The 3 phases described in the CRiSTAL process are widely recognised steps in developing climate change adaptation strategies on a community level. Because climate modeling is usually presented on too large a scale to show direct relationship on impacts to a particular place, the first step is to identify specific impacts to a particular region. The second step is consultation with the specific community related to the selected place to determine how those identified potential changes will impact the economic and cultural practices of that specific area. The priority of resources will be dependent on how valuable individual communities perceive that resource, it is important that the community has ownership of identifying and prioritizing resources. Finally, adaptive strategies can be formulated at a local level once there is an understanding of specific impacts to resources and how much those resources are valued by a community. This process is similar to that described by other researchers (Mendis *et al* 2003; Ford, Smit *et al.* 2006; IISD 2009; Green 2006b; Green, Jackson and Morrison 2009; Green, Billy and Tapim 2010).

Aboriginal and Torres Strait Island communities

In Australia Aboriginal and Torres Strait Islander (ATSI) communities are considered among the most vulnerable Australians to the potential impacts of climate change, because of a combination of social and economic disadvantage and geographical isolation.

The location of many of Australia's indigenous communities in remote parts of northern Australia means that there is a lack of appropriate health services; access to early warning systems is limited; and housing quality is less likely to protect people in remote communities from the extreme weather conditions predicted by climate change (Altman and Jordon 2008; Green, Jackson and Morrison 2009; Green, King and Morrison 2009; McMichael *et al* 2003). Pre-existing health issues such as heart disease, diabetes and obesity will make indigenous people more vulnerable to the problems of exposure to extreme temperatures, mosquito borne disease and spread of infectious diseases (Altman and Jordan 2008; Green 2006a; McMichael *et al* 2003). Altman and Jordan (2008) note also the potential impacts of increases in costs of power and fuel, and the native title implications as ATSI people's access to and control of land is potentially restricted with the loss of coastal land.

The relative lack of input by ATSI people into governmental adaptive strategies for coping with impacts from climate change contributes to the vulnerability of Australia's indigenous people because there is a risk of ATSI people having little or no influence on policy regarding climate change adaptation and mitigation strategies (McMichael *et al* 2003). Indigenous communities must have ownership in formulating adaptation and mitigation strategies that are relevant to them if they are going to work (Woodward *et al* 1998; Ford *et al*.2006; Mendis, et al. 2003; Macchi *et al* 2008).

Another factor that limits a community's ability to adapt to potential climatic change is the lack of diverse income streams available to remote indigenous communities; Adger (1999, 2000) lists a lack of diverse income streams as one of the 3 key indicators of individual vulnerability to environmental change. As Mendis *et al* (2003:35) explain:

> "Economic diversity increases adaptive capacity by providing people with choices…Economic diversity is especially important for resource dependent communities as the resources, such as forests, are climate sensitive and are therefore likely to undergo changes. A complete reliance on one type of industry may be detrimental to a community and limits the capacity to adapt to change".

The contribution of natural resources to the local economy in remote indigenous communities is an important consideration for the impacts of climate change. There are a number of models of how the customary sector, that includes fishing, hunting, bush foods and natural resources for arts and crafts production, contributes to the economy of indigenous Australia. Altman (2005a, 2005b) calls it the "hybrid economy", and includes the customary sector as one of the three pillars of indigenous economics along with state and public markets. The "cultural economy" model, developed by NAILSMA, recognizes the value of using indigenous knowledge and assets to create innovative indigenous involvement with mainstream economies (Hill *et al*. 2008:19) Carbon abatement on indigenous owned land would be an example of a successful "cultural economy". A number of economic models have been proposed, including the "conservation economy", "appropriate economies" and the "real economy" proposed by various indigenous and green organizations (Hill *et al* 2008:19-20).

In terms of impacts of climate change on indigenous communities it is important to understand the customary sector and its role in indigenous economics. This is particularly relevant where local resources provide fresh food for the household (through hunting, fishing or bushfoods), or are used to supplement family income eg. through the sale of woven pandanus baskets. Green, Jackson and Morrison (2008:69) note the potential benefits of a changing economy eg, through carbon sequestration on indigenous owned land.

The North Australian Land and Sea Management Agency (NAILSMA), which represents northern Australia's indigenous interests in land and sea management, is lead agency working with indigenous communities on the issue of climate change. NAILSMA is formed by a partnership between 3 Aboriginal Land Councils[4] and Balkanu Cape York Development Corporation, and is based in Darwin. Water quality, dugong and turtle management, traditional ecological knowledge and enterprise development are some of the projects they are conducting to fulfill traditional owner aspirations in land and sea management in northern Australia.

With regards to climate change and indigenous people, NAILSMA

- provide a forum for communication on the topic, through newsletters, workshops, conferences, website, publications and video
- develop policy and strategies
- advocate for increased awareness of the issue, for both indigenous and non-indigenous people
- run projects such as the Western Arnhem Land Fire Abatement program
- facilitate collaborative research across agencies, and
- encourages interactions and exchanges between traditional owners and scientists eg. International Experts Forum on Climate Change, hosted with United Nations University in Darwin in 2008.

One climate change researcher, Dr Donna Green, has developed climate change projects with indigenous communities, particularly on selected islands of the Torres Straits. Green has published extensively on issues such as health (Green 2006b; Green, King, Morrison 2009), environment (Green 2006a; Green *et al.* 2009; Green, Billy and Tapim 2010), culture (Green 2006a; Green, Billy and Tapim 2010; Green and Raygorodetsky 2010) and law (Green and Ruddock 2008). An excellent overview of the topic is provided in Green, Jackson and Morrison's (2009) Scoping Study prepared for the Department of Climate Change and Energy Efficiency in 2009. This report (available at http://www.climatechange.gov.au/publications/adaptation/risks-from-climate-change-to-indigenous-communities.aspx) discusses projections, potential impacts and includes case studies from indigenous communities across northern Australia and an extensive bibliography.

Green has worked closely with traditional owner representatives in the Torres Straits to develop a recording project capturing knowledge of the environment by traditional owners, called SharingKnowledge (http://www.sharingknowledge.net.au/). The project aims to utilize traditional

[4] Cape York, Carpentaria and Northern Land Councils

knowledge on weather conditions to establish baseline data for current climatic conditions where written records do not exist (Green, Billy, Tapim 2010).

Resilience and resourcefulness

Discussion on potential impacts from climate change to indigenous communities tends to focus on the vulnerabilities and challenges that communities will face, with little or inadequate funding and resources, but it is equally important to emphasize the adaptability and resourcefulness that remote indigenous communities possess.

Natural Resource Management activities such as pest management, carbon trading opportunities and the operation of Land and Sea Agencies as the 'eyes and ears' for land management in remote Aboriginal owned land, are all opportunities that could have potential benefits for ATSI people under current climate change projections.

One successful initiative of NAILSMA and traditional owners is the Western Arnhem Land Fire Abatement program (WALFA), where traditional burning practices provide carbon and biodiversity credits that are sold to Darwin Liquefied Natural gas Pty Ltd (Altman and Jordan 2005b:6). In this project firebreaks and patch mosaics of burnt country are made by traditional owners in the early dry season to prevent the hot and highly polluting fires that typically burn later in the year. In its first two years 256,000 tonnes of carbon were abated and 30 indigenous people were employed on the project (Altman and Jordan 2005b:6).

Considering that 20% of Australia is indigenous estate [Altman 2005b:5], the potential for economic benefits for indigenous Australians through carbon trading is often highlighted, but often without any detail on exactly how the transfer of money will occur. NAILSMA promote the WALFA success story through its website (www.nailsma.org.au), by producing publications, reports and discussion papers on the issue and through workshops with indigenous communities in the north (eg. 2010 Climate Change Workshop). NAILSMA estimates that 100,000 tonnes of carbon emissions have been cut each year under WALFA as well as a range of other benefits such as the transfer of Traditional Ecological Knowledge, better protection for the natural and cultural values of the area, facilitating access to country and providing social and economic stimulus to the relevant communities (Barnsley and NAILSMA 2009:32). While there has been much discussion on the value of an Emissions Trading Scheme in Australia, there appears to be little political goodwill to achieve this result in the short term. The WALFA initiative is not part of a regulatory trading scheme but 'a one off private transaction in an unregulated market' (Barnsley and NAILSMA 2009:33). The WALFA initiative establishes a process for putting an economic value on traditional knowledge and it illustrates how a successful carbon trading system can be established, even without a government supported policy on Emission Trading Systems.

Green describes some of the adaptation strategies that are emerging in indigenous communities in Australia, particularly the Torres Straits islands which are seeing the effects of rising seas levels (2006b). Adaptation strategies include improved emergency management plans, reinforced and extended sea walls, planning for relocation as a last resort, and building on stilts. Torres Strait Island councils, eg. Mer, encourage residents to build on higher inland parts of the island away from the shoreline (Green 2006b:8). On Saibai Island Green notes to reintroduction of houses built on raised stilts, a traditional form of building recorded in late 19th Century photographs (see Green 2006b:8, Figure 5). The reintroduction of

building on stilts on Saibai is an example how traditional knowledge can inform adaptation strategies for dealing with impacts from climate change in the future.

The capability of a society to adapt to a changing environment determines the long term success of that society (Diamond 2005). Rising sea levels, volcanic eruptions and other major natural disasters have been occurring throughout the time indigenous people have lived in Australia. Archaeological evidence indicates that people first arrived in Australia at a time when sea levels were much lower, and the continent much larger. The first arrival of people to Australia is likely to have occurred around 62,000 years ago when the sea level was around 85m lower than it is today (Flood 1999:36). Throughout the Pleistocene there was great fluctuation in global climate and erratic rises in sea level. The average global sea level rose between 1 and 3 cm annually from 10-15,000 years ago (Flood 1999:212). By 7,000 years ago sea level rise is thought to have slowed and stabilized to its present extent around 5,000 years ago (Flood 1999:218).

Stories of the rising waters form part of the traditional knowledge of Kowanyama communities. Kowanyama is a coastal western Cape York Peninsula community, on the shore of the Gulf of Carpentaria, which once formed an inland lake bounded by what is now Cape York Peninsula, Arnhem Land and New Guinea. The United Nations University have produced video clips for You Tube illustrating the impacts of climate change on indigenous people. For example, one clip (United Nations University 2009) features a senior Kunjen speaker, Inherrkowinginambana, from Kowanyama, on western Cape York Peninsula, talking about the risk of saltwater intrusion to the freshwater supply of the community from rising sea levels in the future. He also describes similar events from the past, such as how the kite, an important Kunjen creation figure, built a stone wall across a creek inlet to prevent the saltwater from reaching freshwater further upstream at a time of rising sea levels in the past. The water kept rising and the kite had to build the wall higher and higher. The stone wall is shown in the video, and this story illustrates how the Kunjen community faced environmental change in the past.

Oral histories describing reactions to environmental change, notably flooding, are found in many indigenous mythologies across Australia (Flood 1999:212-3; Mudrooro 1994). In his *A-Z of Aboriginal Mythology*, Mudrooroo describes Aboriginal mythologies of flooding creating the current landscape in the north (the Djunggawul myth describes the separation of Elcho Island from the mainland 1994:46); the south (Tambo River flooded as a consequence of people breaking the customary practice of sharing food 1994:65); the east (an injury to the dolphin caused flooding that created islands, channels and swamps at the Logan river mouth, according to Bunjulang oral history 1994:78); and the west (oral stories from Jindjiparndi people from near the Burrup Peninsula in WA describe sea level rise flooding 30 miles inland 1994:25). In some stories the rising sea levels are stopped by creation heroes, such as Gunya and his wives who heated stones and rolled them down the hill into the ocean to prevent the rising seas on the east coast (Mudrooroo 1994: 15). Often the environmental change took place as a consequence of a person's actions that should not be permitted under traditional law, for example the Kurnai account of the frog that swallowed all the water, limiting the water that was available to others. In response, the eel danced until the frog laughed so hard that the water gushed from his mouth, causing a flood that drowned many people (1994: 67).

Indigenous accounts of environmental change identified through oral history are unlikely to provide literal assertions of past events. However, they do demonstrate the fact that indigenous people have coped

with and adapted to a high level of environmental change in the past in Australia, and this could form an empowering basis for discussions on climate change and indigenous communities for the future.

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