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Climate change, migration and adaptation in Funafuti, Tuvalu

Colette Mortreux, Jon Barnett *

Department of Resource Management and Geography, The University of Melbourne, Victoria 3010, Australia

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ABSTRACT

This paper shows the extent to which people in Funafuti – the main island of Tuvalu – are intending to migrate in response to climate change. It presents evidence collected from Funafuti to challenge the widely held assumption that climate change is, will, or should result in large-scale migration from Tuvalu. It shows that for most people climate change is not a reason for concern, let alone a reason to migrate, and that would-be migrants do not cite climate change as a reason to leave. People in Funafuti wish to remain living in Funafuti for reasons of lifestyle, culture and identity. Concerns about the impacts of climate change are not currently a significant driver of migration from Funafuti, and do not appear to be a significant influence on those who intend to migrate in the future.

1. Introduction

It is well established that climate change poses serious risks to the well being of Pacific Island peoples (Mimura et al., 2007). Existing and increasing concentrations of greenhouse gases seem likely to result in increases in mean and extreme air and ocean temperatures, rising sea levels, changes in precipitation patterns, and increasing intensity of extreme events. These changes are in turn likely to drive changes in the ecosystems upon which Pacific Island peoples depend for their livelihoods and cultures, including coastal erosion and inundation, coral bleaching, changes in fisheries distribution and abundance, saline contamination of freshwater, increasing risk of disease, and declining agricultural productivity. So grave are the risks, in particular to low-lying islands such as atolls, that there is growing speculation in the media and in the academic literature that climate change may force people to migrate from their island homes.

Displacement as a result of climate change is not a concern for Pacific Islanders alone, although small island states have received special attention. Low-lying areas situated near major rivers, deltas and estuaries are also vulnerable to sea level rise – for example in Bangladesh, Vietnam and India – and this poses risks to the sustainability of those communities (Stern, 2006; Agrawala et al., 2003; Abrar and Azad, 2004). Historically, drought and desertification have been major drivers of population movement in the Sahel, Ethiopia, Argentina, Brazil, Syria and Iran (Piguet, 2008; Hammer, 2004; Leighton, 2006). These cases may not be directly attributable to climate change, but increased frequency and intensity of drought events are expected as a result of climate change, and this could lead to similar patterns of displacement. What makes the case of Tuvalu, and other small island states, so prominent, however, is that they are obviously exposed and sensitive to the sea level rise expected to result from climate change, and there is a certain dramatic appeal about an island nation state facing total inundation.

Yet this speculation may be premature. Most of the research on climate change impacts in the South Pacific has focussed on the vulnerability of ecosystems, with far less research into adaptation – that is, the ways in which social and ecological systems can avoid or adjust to actual or expected climate impacts (such that an extreme outcome such as forced migration can be avoided) (Mimura et al., 2007). There has been very little consideration of the capacity of social and ecological systems to adapt, the constraints and barriers to adaptation, and the costs of and limits to adaptation. Therefore, the widespread speculation about migration as an adaptation strategy in the South Pacific does not take account of what can be achieved through adaptation, meaning that there is insufficient evidence to draw conclusions about the likelihood (and desirability) of migration as an adaptation strategy.

The strategy of relocation of whole populations in the Pacific Islands was first suggested by Brian Fisher, then executive director of the Australian Bureau of Agricultural and Resource Economics, who in 1996 explained the "appeal" of relocating small island

* Corresponding author. Tel.: +61 3 8344 0819; fax: +61 3 9349 4219.
E-mail address: jbarn@unimelb.edu.au (J. Barnett).

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states due to the financial "costs and benefits" of this as compared to the costs of mitigation (cited in Bita, 1996). Others have proposed institutional mechanisms to facilitate the movement of 'climate change exiles' or 'environmental refugees' as a form of compensation for climate change impacts (Byravan and Rajan, 2005, 2006; Myers, 2002). Arguing against these proposals, Adger and Barnett (2005) suggest that encouraging migration as a solution to climate change detracts from the need for adaptation policies to allow people to "lead the kind of lives they value in the places where they belong" (Adger and Barnett, 2005, p. 328).

Outside these more scholarly debates, popular awareness about climate refugees from the Pacific is high. The Pacific Islands, and Tuvalu in particular, are widely understood to be places from which people are and will increasingly be forced to move. For example, in 2001 just one newspaper (*The Sydney Morning Herald*) reported 21 times on Tuvalu as a site where forced migration was inevitable because of climate change (Farbotko, 2005). There have equally been numerous documentaries describing Tuvalu as 'disappearing', 'drowning' and 'sinking', and resulting in forced migration (Chambers and Chambers, 2007). Indeed, even *The Inconvenient Truth* showed images of spring tide flooding in Funafuti, accompanied by the words "... that's why the citizens of these Pacific nations have all had to evacuate to New Zealand". The media is not entirely to blame for these sensationalist accounts. Early in the UN Framework Convention on Climate Change process the Tuvaluan Government sought to raise awareness about the risks of climate change by talking about the possibility of island abandonment during Conferences of Parties (Connell, 2003). However, such pronouncements from the Government have been rare, in a context where small countries struggle to be heard, and are never as dramatic as those made by the media. Adding to the problem are non-governmental organisations whose desire to raise public awareness about the risks of climate change can lead them to sensationalise the risks, and Tuvalu is most often the *cause celebre* that is used.

Climate change does indeed pose very serious risks to the sustainability of populations living on islands in the Pacific, particularly those living on low-lying atolls (Barnett and Adger, 2003). The nine islands that comprise Tuvalu are all highly sensitive to climate change because they are very low-lying, their morphology is entirely dependent on coral growth, they have shallow freshwater lenses which are easily depleted in times of drought, have high population densities, and people's diets are heavily dependent on fisheries. Capacity to adapt to climate change is generally low in as much as there are few reserves of land available and no land that is more than 2 m above sea level, household and national incomes are low, and access to technology and infrastructure is limited (Barnett and Adger, 2003). While there are actions that can be taken to adapt to climate change, such as improved rainwater harvesting, the cost of most of these are beyond the means of households and government (GoT, 2007). International assistance is therefore a critical determinant of adaptive capacity in Tuvalu.

The likelihood of rising morbidity, mortality and forced migration (assuming movement is practically and legally possible) from Tuvalu increases as the speed of changes in the climate increases. This makes deep cuts in emissions of greenhouse gases necessary in order to reduce the magnitude of the adaptation task (and therefore increase the efficacy of adaptation). It is worth noting here that 'deep cuts' means stabilising concentrations of gases in the atmosphere so that global average temperature stabilises at below 2 °C above pre-industrial levels, given that at 2 °C coral bleaching may become an annual event in Tuvalu (Donner et al., 2005). But there is nothing inevitable about climate-induced catastrophe in Tuvalu; deep cuts in emissions such that the rate of change is slowed, coupled with a systematic and well resourced suite of adaptation strategies can together enable island social–ecological systems to adapt such that negative demographic outcomes can be avoided (Barnett, 2005).

Given this possibility of effective action to enable sustainable habitation of islands in the Pacific, there are risks associated with discourses of displacement. Existing discussions about displacement have tended to obstruct the space needed for meaningful analysis and careful debate about the magnitude and timing of risks, and the best ways to avoid and respond to them. In particular, the discourses of displacement effectively circumvent careful consideration of adaptive measures that could be supported by the international community to prevent forced migration, and neglect the role of individuals in negotiating climate change and determining their own responses based on their own needs and values. The discourse gives donors cause to consider migration rather than adaptation as the principal form of support to Tuvalu. Overstating the dangers of climate change may also alter the calculations of return made by investors and aid donors, and, if internalised by local people, may lead to practices of unsustainable development such that the impacts of climate change materialise more through the idea of climate change than through material changes in ecosystems driven by climatic processes (Barnett and Adger, 2003). Campbell (1997) argues that discourses of vulnerability downplay the resilience of communities, cast them as powerless, and risk reifying otherwise perceived relationships of inequality between the powerful and weak through paternalistic interventions to 'save' the powerless Other.

This unhelpful sensationalism surrounding climate change and migration in the Pacific flourishes in the absence of evidence. A systematic approach to collecting evidence to inform the issue is required, and we describe such an approach in this paper. Our study is informed by our own and other research on climate impacts and adaptation in the Pacific Islands, which we do not discuss in any detail here (for our own see Barnett, 2001, 2005; Barnett and Adger, 2003; for the most recent summary of all research see Mimura et al., 2007). It is also informed by what is already known about migration in the Pacific, and by existing research on climate change and migration, which we discuss in the following section. Finally, it is informed by a small empirical study in Funafuti, which we explain and discuss in later sections.

2. Climate change and migration

At least two key issues need to be considered in weighing up whether an individual may migrate due to climate change: what they perceive to be the risks associated with climate change; and how they analyse the benefits and costs arising from migrating/staying. It is the way these spheres intersect that determines possible migration responses to climate change. There is yet to be a study in the South Pacific that integrates these bodies of knowledge. While scholars have addressed migration in the Pacific, environmental factors have been largely overlooked. Outside of the Pacific, scholars have addressed migration as a response to climate change (Black, 2001; Castles, 2002; Castles and Miller, 2003; Lonergan, 1998; Hugo, 1996; McLeman and Smit, 2006), as well as the importance of assessing individual perceptions of climate change risk and adaptive capacity (Dessai et al., 2004; Grothmann and Patt, 2005; Marx et al., 2006). This section will briefly review the bodies of literature in turn – what is known about migration in the Pacific, what is known about climate change and migration, and lastly what is known about climate change risk and decision-making processes.

Migration studies in the South Pacific indicate a multitude of variables that shape individuals' decisions to migrate, including

factors at the point of origin, factors at the destination, intervening obstacles such as distance and institutional constraints, and personal circumstances. Factors understood to encourage migration include the experience of difficulties at the place of origin, such as social and development concerns and other personal circumstances, coupled with perceptions of better employment and other opportunities elsewhere (Bedford et al., 2000; Bryant, 1990; Connell and King, 1990; Cowling, 2002; Munro, 1990). The existence of social networks at the destination may contribute to an individual's decision since these provide important practical support in terms of accommodation and employment connections, as well as providing a sense of community (Macpherson and Macpherson, 1990; Morton, 2002; Ravuvu, 2002). Factors encouraging people to stay are not well-explored in the South Pacific, but theory suggest several, including: an individual's knowledge of and access to facilities and financial resources; place-specific work knowledge and skills; and the value of close ties with one's cultural identity through a given community (Faist, 2000; Oderth, 2002).

The role of remittances is particularly important in household decisions about migration in the South Pacific. In the early 1970s it was estimated that more than a third of Tuvaluans were living overseas. The majority of these migrants were working in the Nauru and Banaba phosphate mines or as seafarers (Connell, 1999). Today the mines have closed but seafaring remains a popular employment choice for young men. Seafarers tend to have a cyclical pattern of migration and remit a substantial amount of their earnings to their families – seafarers in Kiribati have been known to remit up to 70% of their earnings (Borovnik, 2006, p. 155) and in Tuvalu, remittances account for 17% of GDP (Stahl and Appleyard, 2007, p. 6). Usually in the form of cash transfers, the money goes towards family expenses and to local development projects such as building new churches or schools (Fairbairn, 1993). On the household level remittances and return migrants are seen to boost a family's overall skills, experience, and finances. According to Connell and Conway (2000, p. 59), families carefully deliberate as to whom within the family would be most successful overseas. There are even some suggestions within the literature that the remittances are so valuable for families that the fertility rate has risen in some small island states due to parents' desire to improve their chances of having more remittance earners (Moore and Smith, 1995, p. 107). This corresponds with Stark's assessment of migration decisions in which family or household interests may hold greater sway over migration outcomes than individual interests (Stark, 1991).

Given the lack of literature addressing climate change and migration in the South Pacific, it is useful to learn from studies from beyond the South Pacific region. Since the late 1980s a body of literature has emerged that focuses on the migration/environment relationship. The bulk of this material has stemmed from disaster studies, with a particular focus on forced migration (El-Hinnawi, 1985; Jacobson, 1988; Myers, 2002; Byravan and Rajan, 2006). Much of this literature has popularised the debate, simplifying environmental change as *the* causal factor in population movement (El-Hinnawi, 1985; Jacobson, 1988; Myers, 2002; Byravan and Rajan, 2006). In the case of natural disasters, environmental change may be a causal factor for population movement – and here the tendency is for communities to move to the closest safe area and remain until it is safe to return home (Lonergan, 1998). Population movement as a result of cumulative environmental changes, however, is inevitably harder to identify. Cumulative environmental change has a slow onset and tends to occur alongside economic, social and political changes. As a result, it is rare that environmental change alone can be singularly attributed to population movement (Lonergan, 1998; Castles, 2002; Castles and Miller, 2003). For less developed countries in particular, additional stressors – such as high population growth and density, low GDP, unemployment, unequal access to resources and services, poverty, and armed conflict – may be significant "push" factors for migration operating in concert with environmental change (Afolayan, 2001; Afolayan and Adelekan, 1998; Castles and Miller, 2003; Kates, 2000; Denton, 2002; Massey et al., 1993). The adaptive capacity and resilience of communities is therefore central to any debate on the migration and climate change relationship (Meze-Hausken, 2000; Hugo, 1996; McLeman and Smit, 2006; Tompkins and Adger, 2004; Fraser et al., 2003).

Individual perceptions of climate change risk are also central to how individuals respond to climate change. Risk management and associated decision-making is not so much a purely rational, technical process, as it is a highly subjective process that is value-laden and embedded in social context (Slovic and Weber, 2002; Kunreuther and Slovic, 1996; McDaniels et al., 1996). Perceptions are informed by a variety of sources, not merely scientific reports, but including what 'experts' say, what their peers say, and what the media says (Connell, 2003; Farbotko, 2005). An individual's risk perception is also informed by their trust in regulators and other authorities, personal experience, wealth and health, values, worldviews and the availability of information (Dessai et al., 2004; McLeman and Smit, 2006). Individual perceptions of the efficacy of adaptation in addition to individual confidence in the capacity of the community to affect adaptation policies are also important in informing risk perceptions (Barnett and Adger, 2003; Grothmann and Patt, 2005).

There have been some analyses of cognitive processing of information and how individuals form decisions with regard to climate change (Grothmann and Patt, 2005, p. 201; Marx et al., 2006). These studies demonstrate that decision-making is not a uni-directional and sequential process; instead it is incremental and at times multi-directional – where one step towards a decision may be contradicted as new information and experiences arise and accrue (Grothmann and Patt, 2005, p. 201; Marx et al., 2006). This suggests that individual responses to climate change may not be as rational as scientific and economic assessments of adaptive behaviour assume (Grothmann and Patt, 2005). It is therefore necessary to assess people's risk perceptions in order to anticipate future possible migration movements in relation to climate change. Indeed Grothmann and Patt (2005) surmise that the perception of risks of change may be a far more important factor in decision-making than the realisation of biophysical change *per se*.

3. Methodology

Data for this paper was collected in Funafuti over three weeks in July 2007, and is supported by observations made during this time and over many years of interaction with Tuvaluans engaged with the problem of climate change. A total of 40 semi-structured interviews were conducted. There were 28 interviews with people responding in a personal capacity. Of these, 64% were female and 25% were students, with the lack of males in the sample explained by the high number of working age males employed off-island as seafarers. Interviews with this group focussed on migration rather than climate change. Respondents were asked about what they liked/disliked about living in Funafuti, whether they were intending to stay or leave and for what reasons. It was critical that respondents were in no way prompted by the interviewer to cite climate change as a reason behind their migration decisions. Therefore specific questions about climate change were not asked until the very end of the interview.

Nevertheless, 13 respondents raised climate change as an issue before the questions specific to climate change were asked. This is most likely to be because in recent times there have been many

journalists and researchers asking questions about climate change in Funafuti. During the course of fieldwork for this project there was one journalist and three other researchers interested in climate change in Funafuti. As is to be expected within such a small community – Funafuti's population is 4492 (Tuvalu Census, 2002) – many of the people approached had already been interviewed by one or more of these researchers. Researcher fatigue is therefore a problem in Tuvalu, and may have affected responses to this research.

In addition, there were 12 interviews conducted with people responding in a professional capacity, five of whom were to some degree involved in the climate change project. This group was comprised of bureaucrats, senior members of non-government organisations, church leaders, and a former senior government official. Each had lived in Funafuti for a long time, they were closely involved with the community, and their professional roles gave them particular insight into specific issues that would otherwise be difficult to understand within the short fieldwork period. These interviews centred on the interviewee's professional roles and their thoughts about community attitudes towards climate change and migration. These interviews, however, inevitably elicited responses of a more personal nature as well.

4. Results

Of the 28 personal interviews conducted, 19 of the respondents planned to continue living in Funafuti indefinitely, with nine indicating that they wanted to leave Funafuti at some time in the future. Of these nine, two had migration visas already organised.

Respondents gave multiple reasons for staying in Funafuti. Table 1 shows the main reason each person gave, with the most frequently cited reason being for reasons of 'lifestyle'. 'Lifestyle' here describes several key factors including a low-stress working environment, close family networks, free time for social activity, and enjoyment of the natural environment.

It is notable that many people spoke of 'a good community feeling' that they felt was unique to Tuvalu. Respondents regularly referred to Funafuti as 'my paradise' in which life was 'easy' and 'peaceful'. One woman stated:

> Is good here. It is my paradise. I can sleep wherever I want, do whatever I want. I can visit my sister and just talk – and sleep there if I want. You can't do that in Fiji. I can sleep and work when I want.

Another woman further highlighted the unique and easy lifestyle in Funafuti:

> Here, a man might catch lots of fish one day and sell it, and the next day he can relax, sleep, visit friends, loaf around for the whole day. You can't do that in New Zealand. You have to work every day, work maybe two or three jobs – and hard labour, construction or factory work – just to make a living.

Table 1
The main reason for staying in Funafuti.

Main reason given to stay in Funafuti	Number of interviews stating these reasons
Lifestyle	9
Employment	2
Family	1
Old age	1
People	2
Identity	2
Community commitment	2
Total	19

As these quotes indicate, Funafuti's lifestyle was often expressed in comparison to the (perceived) lifestyles of people in other countries. Migration was in this way often described as difficult, involving endless hard work, separation from extended family, and separation from that special 'community feeling' inherent to living in Funafuti. Funafuti's lifestyle is therefore highly valued and is a critical factor in people's desire to remain on the atoll.

The officials who were interviewed brought up the issue of identity as a critical reason to stay in Funafuti, with one describing leaving Tuvalu as "leaving part of your identity behind". This group identified climate change as a serious concern for Funafuti, and most expressed a sense of responsibility to stay and help sustain the community in the face of climate change. For one official this commitment was not without internal dilemmas and burdens. He felt considerably compromised between serving his family and serving his community:

> For me, I have children and I think they might think I have put them in danger [by staying here] – not now because they are too young but when they are older they might think I did not do the right thing – looking back on now. Because I am the one to make a decision and look after them and I am staying here when I know something is wrong.

While the commitment of the officials to remaining in Tuvalu seemed genuine and is consistent with our experience with public servants from Tuvalu over many years, it is nevertheless important to note that even if they intended to migrate, it is unlikely that the officials giving personal interviews would have expressed this in the context of the interview.

Of the nine people who planned to leave Funafuti, the majority were seeking better employment opportunities, and 'more opportunities' more generally (Table 2). The favoured migration destination was New Zealand. New Zealand was seen as the easiest place to migrate to due to regulations governing the award of visas and the existence of family networks that could sponsor and support migrants. Auckland was the preferred city largely due to existing family networks. Australia was the preferred destination of three respondents, and Townsville and Brisbane were the cities of choice again due to family networks but also because the climate there was considered to be comparable to that of Funafuti.

The interviewees who wanted to leave Funafuti shared a sense that more was 'happening' overseas and that this would be beneficial to them in terms of personal development and in terms of finances.

> Here is good, people are happy and relaxed but there more things are happening, you know?
>
> I'm happy here – but maybe there is better. I can find better work.

There were, however, two respondents who gave different reasons for wanting to leave. One respondent would have preferred

Table 2
The main reason for leaving Funafuti.

Main reason given to leave Funafuti	Number of interviews stating these reasons
Employment	4
More opportunities	3
Access to special services	1
Climate change	1
Total	9

to stay in Funafuti, but she had two children with disabilities who required specialist services unavailable in Tuvalu. For this woman migration was a necessity for the education and care of her children. The second exception was a woman who cited climate change as a central factor influencing her decision to leave. She initially cited family unification as her main reason to migrate, but when asked whether she would stay in Funafuti if her whole family were together she stated that she would still plan to leave as she felt that Funafuti was no longer a secure place for her children because of climate change. She had already organised the visas for her family and planned to leave within six months.

Only one other of the nine people planning to leave raised climate change as a reason to leave, and this was secondary to other reasons. This person said "my plan is to leave, partly because of climate change but also other reasons – work, and to experience other things". Most of her responses nevertheless concerned work opportunities and these were clearly her main reason for leaving rather than climate change. She predicted severe climate change impacts to occur in Funafuti over the next 10–20 years and planned to leave in a few years time when she was still young and when she had enough work experience in Funafuti to help her find a job elsewhere.

If climate change were a major driver of migration from Funafuti, one would expect it be mentioned far more often than it was by respondents. Instead, employment and better opportunities were cited as the major reasons to migrate. Of the nine people planning to migrate, only one cited climate change as a primary factor influencing their decision to leave, with another mentioning climate change as a secondary factor. These two respondents also cited other factors that informed their decisions – namely family unification, employment and a desire for greater opportunities. Given this, it is clear that climate change itself is not a significant factor informing respondents' decisions to leave Funafuti.

5. Explaining the results

Background information for each respondent was collected at the start of each interview for the purposes of identifying variables that might explain patterns in the responses. Ten explanatory variables were identified based on a review of cognate research on migration in the Pacific, and climate change and migration. Of these, gender, education, family origin, household size, having family overseas, having previously travelled internationally, and unemployment, do not appear in the responses. While the sample size is small, the results indicate that household income influences people's responses to some degree. The age of respondents also explains the responses to some degree, with the related number of children playing a lesser but notable role.

Respondents aged between 20 and 40 years old were more likely to want to migrate, whereas those below 20 or over 40 were more likely to want to continue living in Funafuti. With the exception of the one interviewee whose children required specialised care, all of the interviewees above the age of 40 intended to continue living in Funafuti. The interviewees under the age of 20 are best viewed in relation to their employment status. Those who were still students (under 18) were more likely to want to continue living in Funafuti (83%), whereas those who had completed schooling (18 and over) were more likely to want to migrate (66%).

This evidence is backed up by personal accounts:

> Most older people prefer to stay here. Although parents and children might not spend much time with the grandparents here, at least they are with other people, friends you know, who you can talk to.

Some of the older interviewees felt that their whole lives had been spent in Tuvalu, and that migrating would be too much of a change at their late stage in life. With regard to climate change one retiree explained, "maybe things will get bad but even then, my wife and I are old – we are happy and in God's hands".

The number and age of the children of respondents relates to age as a central explanatory variable. Given their ages, the majority of those intending to leave Funafuti have no children, whereas the majority of those intending to stay in Funafuti have children (even after the students have been excluded from the sample). Of those who are intending to leave and who have children, the average age of their children is lower than that of the children of those wishing to stay. None of the respondents in the group that were intending to leave had children averaging above the age of 10, whereas for those intending to stay in Funafuti the average age of their children was in excess of 20.

From the available data, the average household income of those wanting to leave is lower than the average income of those wanting to stay, although it is important to note that respondents were explicitly given the option of not answering this question and half the respondents chose not to. Disregarding non-disclosed incomes, 25% of the group wanting to leave stated their income was below the average weekly household income in Funafuti ($340 per week, GoT, 2006) and 50% described their income as much below $340. In comparison, only 33% of the group intending to stay described their income as below $340 per week, and no one described their income as much below that figure. The findings indicate a connection between lower income households and the likelihood of individuals to migrate, although given the small sample size a more precise and extensive investigation is needed.

This analysis shows then that age and income are attributes associated with migration intentions. Young people on low incomes (but not students), and/or with young families are more likely to migrate than those that are older, wealthier, and with older children. These results are consistent with research on migration in the Pacific Islands (e.g. Bedford et al., 2000; Bryant, 1990; Connell, 1999, 2003; Connell and Conway, 2000; Finau, 1993; Haberkorn, 1992; Loomis, 1990; Marsters et al., 2006). How this may change in the future, and the extent to which climate change may play a role, remains to be seen. For the moment, however, it appears that the drivers of migration from Funafuti are not related to climate change.

6. Discussion

This section provides a richer understanding of the dynamic nature of local responses to the issue of climate-induced migration. It explores three key factors that influence the way people in Funafuti perceive the problem of climate change. The discussion will draw on observations and statements from both the personal interviews and the interviews with officials.

First, it is clear that religion plays a very significant role in shaping people's responses to climate change in Tuvalu. Of all the interviews conducted, around half raised religion in response to climate change. These people believed that climate change was not an issue of concern due to the special relationship Tuvalu shares with God and due to the promises God made to Noah in the bible. The strength of this belief is reflected in the national motto *Tuvalu mo te Atua*, meaning 'Tuvalu is for God, God is for Tuvalu' (GoT, 2005, p. 49).

In interviews people consistently referred to the story of Noah as evidence that God would not allow further flooding. There was a sense that Tuvalu was given by God to the Tuvaluan people and

that God would ensure that this would remain the case into the future:

> You know about the rising sea water, climate change, yeah? Some think this is a problem and a reason to leave. But more people do not think about this too much – because people believe in God and that this place will be safe. This is our belief.

Faith in God's protection shaped responses to climate change for the young and old alike. The following quote was from a teenager who had lived in Funafuti her whole life:

> I'm not worried. I mean, God created this place, and what for? What for? So we could live here.

Despite efforts to challenge existing interpretations of religious text by some religious leaders, faith that God will protect Tuvalu is such a strong belief within the community that some officials identified religion as a barrier to awareness of and adaptation to climate change.

The discourse that binds God/people/place makes it hard not to conclude that there would be a very profound sense of loss if the islands were to become uninhabitable and migration became necessary. Although climate change puts at risk the livelihoods, property, health and 'community feeling' unique to Tuvalu, perhaps the most significant potential social impact of climate change in Tuvalu is the existential tragedy of the loss of Tuvalu as God's place for the Tuvaluans.

A second factor influencing whether or not respondents were concerned enough about climate change to consider migration was their personal experience (or not) of environmental change. Many respondents did not feel that climate change was an issue to be worried about because they themselves had not observed any environmental changes that they believed to be out of the ordinary, for example:

> There are the high tides, but other than that not much is changing. Things have been pretty much the same for 30–40 years. So people are not very worried.

One important factor to consider with regard to observations of environmental change is that people need to have spent a considerable amount of time in a given location to be able to recognise and compare change. Many people in Funafuti may not have spent enough time on the atoll to observe environmental changes given that 39% of the population is under the age of 19, and only 25% are indigenous to Funafuti (derived from statistics in Tuvalu Census, 2002, pp. 20, 24, 25). A lack of a temporal reference against which to benchmark observations perhaps explains why the students in particular were very dismissive of climate change. According to one student "high tides happen every year, this is just normal – they go after a month or so", and another, who had only recently moved to Funafuti, dismissed climate change as "rumours".

In contrast to the young people, most of the older interviewees, and people native to Funafuti, claimed to have observed changes in the environment. Thus, for one local:

> Many people living in Funafuti have come from outer islands and have not lived here a long time so they don't know what it was like before, they don't see the changes. But for me it *has* changed, already.

In particular, many of this group considered that the high tides that have inundated Funafuti in recent years were of a larger magnitude than in the past. This is not without scientific basis, although the cause could be as much geomorphologic as changes in sea level *per se* (see Yamano et al., 2007; SOPAC, 2006, 2007).

Those that had observed environmental changes were highly concerned about climate change. The security of people whose houses had been flooded was particularly affected. One person, whose house had been flooded in the high tides, noted that when he first built his house there had been around 20 m of land between his house and the ocean and that now that had reduced to around 10 m. This trend of encroachment, coupled with restrictions on resettlement due to pressures on land and barriers in the land tenure system (see Crocombe, 1987), had given him cause to consider migration.

It is nevertheless the case that most people interviewed were not overly concerned about climate change. This may be because they could not observe its effects, believed that God would not allow it to damage Tuvalu, or they simply had a limited awareness of the issue. It may also be because people already have to manage numerous challenges and as climate change is a future problem, it is a discounted concern. Tuvalu is a Least Developed Country and in Funafuti overcrowding, poor housing, inadequate sewerage and waste disposal, unemployment, nutrition-related health problems and under-resourced health services are just some of the issues facing the community (AusAid et al., 2007, p. xxiii; Bryant, 1990, p. 86; Connell, 1999, p. 13; Connell, 2003, p. 92; Moore and Smith, 1995, p. 108). In these circumstances, future problems are discounted heavily, and this may be even more the case for climate change because the timing and severity of future impacts is uncertain.

A third factor influencing whether or not respondents were concerned enough about climate change to consider migration is their attitudes towards 'home'. So, while respondents identified things they did not like about Funafuti, including crowding, pollution and litter, alcohol abuse, dependence on the cash-economy, cultural change, and obligations to support extended family moving in from the outer islands, none of them considered these problems as reasons to leave. Yet when asked what people might miss if they migrated, many found it difficult to identify any single factor independent of the whole bundle of good things they associated with life in Funafuti, including having a distinct identity, a feeling of belonging (because of genealogy and community), lifestyle, family connections, and culture, all of which seemed to be irrevocably tied to place. Thus, comments like "I would miss everything, this is the life I know" were common.

Indeed, some people indicated that they would never leave despite what happens. For example, one woman in her 50s said that even if climate change escalated to a point where the community needed to leave, she would prefer to stay and "go down with it". Like many older Polynesians, she offered an allegory to explain this:

> When I was little, there was a big hurricane, you know, hurricane Bebe in 1972. And it came in, the rain was like stones – it hurt. And I thought this is it, this is the end of the world ... and at the time we went to find a safer place in another building and my grandfather and grandmother, they were still alive at the time, they said, "you go, leave, find another place that is safe. You are young – run, find protection. And if God says today is the day, then we stay here and go down with it." You know, that is the way with older people. And we left and stayed in a concrete house that was filled with water and we just sat and waited. After, we went back and our place was just the roof. But the roof was good you know, and my grandparents were sitting under it – waiting, fine.

The profound attachment to Funafuti and Tuvalu that people feel – so much so that they are prepared to suffer at home rather than move – points to the extent to which full-scale migration would be a tragedy for most Tuvaluans.

It is not surprising then that those officials who had considered the issue rejected migration as a form of adaptation. These people described migration as the "last option", and recognised the sacrifices it would entail, saying for example that "to get a property and relocate would be to lose our sovereign right and our identity", and "I don't want to see our case as terminal – to bring up environmental refugees is, in some ways, to say we give up the fight". For these people migration means a loss of identity, not just on a personal level but in terms of the nation. One official simply stated, "you cannot make another Tuvalu". Nor, would we add, could Tuvaluans ever be compensated for their losses.

7. Conclusions

This paper challenges the widely held assumption that climate change is, will, or should result in large-scale migration from Tuvalu. For most respondents climate change is not a reason for concern, let alone a reason to migrate. The vast majority of those who are considering migration do not cite climate change as a reason to leave. So, despite the international media and some academic reporting, individuals living in Funafuti do not necessarily identify climate change as a risk, or if they do it is a heavily discounted risk. Personal observations of environmental change, belief in God, and the significance of home are important factors shaping individual perceptions of climate risks (and responses).

This paper has not speculated about what the future may hold for Funafuti, choosing instead to focus on the evidence currently available about climate change and current migration intentions. It is difficult to predict how perceptions and responses with regard to climate change may alter in the future. Perhaps the sense of risk due to climate change will amplify rapidly due to the experience of an adverse event, or a succession of events, such as flooding or storm activity. Indeed, even a small event could trigger marked change in the way people in Funafuti perceive of risk associated with climate change and this could markedly change responses. The value of this research, however, is not to speculate over Funafuti's future, it is to assess the current perceptions and values of a community facing climate change risk.

In terms of research on the human dimensions of climate impacts, this study demonstrates that individuals and communities *respond* to events and information, things do not just happen *to* people. It shows that social responses to climate change are fundamentally mediated by perceptions of the problem and of the benefits and costs of responses, which themselves are contextualised by the larger social milieu. People filter information, shaped by their multiple experiences, values and observations, and respond in ways that reflect their diverse experiences and circumstances. This has a direct impact on people's decision-making processes and therefore needs to be closely considered in assessments of population movement with regard to climate change. Social responses to climate change will therefore be non-uniform and to some degree unpredictable, and they cannot be determined from afar.

In terms of research and policy on climate change in Tuvalu, the reasons why people want to stay are important given that the overwhelming majority of respondents had a preference to continue living in Funafuti. The widely held belief that Tuvalu was given to the Tuvaluan people by God, and the unique 'community feeling' and lifestyle that interviewees valued so highly demonstrates a significant spatial identification and attachment to Funafuti by its local inhabitants informed by cultural, spiritual, familial and historical ties. This deep identification and attachment to Funafuti means that large-scale migration is an outcome that should be avoided at all costs as it would violate core social values and would arguably be a violation of people's human rights. This is not to say that people should not have the choice to migrate, but rather that people should not be left with no choice but to migrate because the international community failed to reduce emissions of greenhouse gases and to support adaptation.

The danger in discourses about climate refugees and in nascent plans to relocate people from Tuvalu is that large-scale migration may be an impact of climate change affected by policy responses in anticipation of climate impacts rather than by material changes in the environment *per se*. Large-scale migration from Funafuti in anticipation of climate change impacts should not therefore be regarded as an impact averted, but rather as an impact transmuted.

To some extent this argument about adaptation, migration, and impact depends on the unit of analysis. On an individual-scale migration could potentially be considered a form of adaptation, particularly for those who are more likely to consider migration regardless of climate change – such as the younger interviewees seeking a 'better life' and improved employment opportunities. However, it is important in terms of policy that collective goods such as culture, identity, and a sense of home also be considered.

The rights of Tuvaluans to continue living in Tuvalu – and the value of Tuvaluan identity and culture to Tuvaluans and the world – means that there needs to be far greater effort at implementing adaptation in the islands to sustain the population and their way of life. There are certainly benefits in expanding the opportunity for people to migrate as it widens people's options to respond to climate change (including the use of remittances) and more generally expands their opportunities to satisfy their needs and values. However, migration should not be regarded by outsiders as the only or most important form of adaptation strategy. So, while migration may need to remain a possibility to consider for the future, the emphasis now needs to be on reducing greenhouse gas emissions on a global level to slow the rate of climate change, and on developing strategies to enable Tuvaluans to adapt in order to sustain life as they know it in the places they value.

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