ADAPTING KIRIBATI, ADAPTING PROJECTS: WHAT HAPPENS WHEN THE WORLD BANK DOES CLIMATE CHANGE ADAPTATION?

by

Sophie Webber

B.A./B.Sc., The University of Melbourne, 2008

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in

THE FACULTY OF GRADUATE STUDIES

(Geography)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

August 2011

Abstract

In this thesis I analyse the effects of the Kiribati Adaptation Project (KAP). The KAP is an early climate change adaptation project and it has been instrumental in the World Bank's (the implementer of the KAP) expansion into the climate change agenda. I situate the KAP in the long, colonial, history of developmentalism and draw from critical development and policy studies to understand this project. Although climate change adaptation and development are contradictory in many senses, they have similarities: they are practiced by the same institutions, with the same project management techniques, and they are implemented through projects. I ask the following research questions:

1. What work does climate change adaptation do as an organising principle for a project?
2. How is climate change adaptation as a policy articulated into grounded practices?
3. What are the unintended effects of a novel climate change adaptation project in an archetypical vulnerable place?

To answer these research questions I draw from six weeks field work in Kiribati, where I met with KAP project managers and consultants, government officials and other interested onlookers. In chapter three, I observe that the KAP was focused on producing technical reports and technical expertise. I analyse why this is the case and what some of the effects of this are. By participating in the KAP, consultants, funders and other i-Matang relatives of the project gain expertise in the novel, and increasingly lucrative, arena of climate change adaptation. In chapter four, I analyse the ways in which i-Kiribati actors assemble and perform their vulnerability to climate change. Performances are an intentional strategy to gain recognition for the plight of the low-lying and fragile atoll nation. Officials and public servants have little choice but to perform

their vulnerability; the Government of Kiribati depends on these finances, but this dependence is uncertain.

The KAP is a key site, as it exemplifies the asymmetries of climate change adaptation and mitigation. The KAP expects to create local resilience in the face of an exogenous threat, in the place least able to be resilient, and least responsible for causing the threat.

Preface

This research was undertaken under with approval from the UBC Behavioural Research Ethics Board, Ethics Certificate Number H11-00709 “Climate and Pacific Society”.

Table of contents

List of tables

List of figures

Acknowledgements

This research was only possible thanks to the participation of many in Kiribati, who were generous with time, ideas and, most importantly, trust. Special thanks also to my supervisors, Drs Simon Donner and Jamie Peck, who have settled my wandering and wondering mind. They, and Dr Leila Harris, have provided thoughtful comments on this thesis and otherwise. Additional thanks to Dr. Simon Donner who generously provided financial support for this field research with a Hampton Fund grant. My studies were also funded by a Joseph-Armand Bombardier Canada Graduate Scholarship from the Social Sciences and Humanities Research Council and a Graduate Support Initiative Award from the UBC. I am grateful to the vibrant, excited and passionate students in Geography, especially in the Climate and Coastal Ecosystems Laboratory and in numerous classes. Final thanks to Mum, Dad and Andrew, who have supported me endlessly from afar; they were not only great proof-readers, but encouraging as I faltered in the incessant rain.

1. **Climate change adaptation as the latest development paradigm**

Late in 2010, the United Nations Framework Convention on Climate Change (UNFCCC) awarded the World Bank the role of trustee for the new Green Climate Fund (UNFCCC, 2010). During the Cancun Conference of the Parties (COP) in December 2010 it was agreed that through the Fund, the World Bank would administer US$100 billion annually for various climate initiatives including adaptation projects. To put this sum in perspective, in the 2010 fiscal year, the World Bank administered US$72.9 billion in loans, grants, equity investments and guarantees (The World Bank, 2010a). This 2010 sum is the largest in World Bank history. The Green Climate Fund will annually distribute more funds than all other World Bank investments – nearly 50% more.

The climate change agenda, embodied in the Green Climate Fund, is the latest incarnation of World Bank developmentalism. The World Bank has continually reinvented itself since the1960s. For instance, Michael Goldman (2005) analyses how the World Bank has responded to social and environmental justice criticisms, especially in response to the building of large infrastructure projects. Goldman shows that the World Bank continues to incorporate these criticisms into its agenda, by 'greening' itself. The 'greening' process involves accumulating knowledge about social and environmental justice subjects and massaging their input and output so as to fit into a managerial mould, primarily through Environmental Impact Assessments. Another area of expertise the World Bank is now building is climate change adaptation. The Republic of Kiribati (an atoll nation in the Central Pacific), and the World Bank implemented Kiribati Adaptation Project (KAP), are the subject of this thesis, as they have become key sites in the Bank's production of knowledge and in sustaining circuits of truth about climate change adaptation projects. Climate change adaptation is the most recent stage in this trajectory of

'greening'. As a consequence, climate change adaptation – in addition to its salience in environmental policy – should be positioned as an episode in the long history of developmentalism.

Most simply, climate change adaptation and development are not the same thing. These policy approaches have different aims and different outcomes. In fact, their purposes can be contradictory: schemes for (economic) development can increase greenhouse gas emissions thus increasing the severity of climate change (Jerneck & Olsson, 2008). Some argue that competitive ambitions for socio-economic development are the principal cause of climate change (Metz & Kok, 2008). Development projects that do not consider the impacts of climate change can increase vulnerability by increasing exposures or sensitivity to climate change. For example, a development project could increase dependence on natural resources that may become scarcer in the future, or build infrastructure on vulnerable coastlines. Development projects are not always and purposefully counter to climate change adaptation, but they can be. The reverse is true also: unless climate change is addressed it will hamper attempts at development (Kok, Metz, Verhagen, & van Rooijen, 2008; Metz & Kok, 2008). These contradictions can be addressed through climate- and development-sensitive strategies (for strategies see Agrawala and van Aalst (2008) and Kok et al. (2008)).

Although development and adaptation strategies are different, they are related. The governance institutions established to implement and finance development projects have become involved in the growing adaptation industry (Agrawala, 2004; Huq & Reid, 2004).[1] The World Bank in particular is invested in climate change adaptation schemes, building on the experiences

[1] Some bilateral aid is now focused on alleviating the effects of climate change, as are numerous non-governmental organisations such as the Red Cross/Red Crescent (see Barnett and Campbell (2010) for a summary of institutional actors in climate change adaptation in the Pacific Islands).

of the KAP. The 2010 World Development Report, *Development and Climate Change* (The World Bank, 2010b) signals the Bank's programmatic commitment to addressing climate change through projects. The report recognises the impacts that climate change will have in developing countries, but argues that through lending and loans from its portfolio of Climate Investment Funds, these problems can be overcome. As noted earlier, this commitment was solidified recently when the World Bank became the implementer of the Green Climate Fund.

Adaptation and development projects are produced in similar financial and institutional circuits. The World Bank does not only administer funds, but also stamps its authority on projects through its regulatory systems. The World Bank has distinct reporting and hiring requirements. These seemingly technical practices imprint themselves on projects, development and adaptation alike. Knowledge about adaptation is also produced in the same establishments, and by the same staff trained and working previously in environmental or ecological economics, in World Development Reports, for example (which Roy (2010) recognises is crucial in the implementation of development schemes). Finally, it is through *projects* – with their limited and pre-specified budgets, time-scales, non-governmental implementation and management, and associated institutional baggage – that development and adaptation are realised. Due to all these similarities, studies produced to understand the World Bank and their and others' development strategies can aid in understanding the production of adaptation.

A common form for adaptation is a climate change adaption project; a temporally and spatially bounded policy solution delivered to the vulnerable locale. Yet there is currently little research investigating what 'actually-existing' projects look like. Similarly, it remains unknown whether such projects achieve adaptation success, or what their side effects might be, aside from the desired adaptation. Amongst such unknowns, the adaptation project continues to be offered

as a suitable solution to our climate woes. In order to address this gap, in the thesis that follows I probe a 'real-life' adaptation project in order to understand what such a thing does. I investigate critical questions – what does an adaptation project look like; what are the intentional and unintentional effects of an adaptation project – and I examine a critical case study: the Kiribati Adaptation Project. The KAP is a key site to address these questions, for several reasons. First, the KAP is formative of the World Bank's growing climate change adaptation agenda, as it is an early demonstration project. Second, climate change adaptation in Kiribati is critical to avoid the certain perils of climate change. Adaptation projects create specific framings of the challenges and places of climate change, which in turn shape the proposed solutions. The project has unforeseen and profound overflows, or side effects which spread throughout Kiribati, with the KAP as their entry point (Ferguson, 1994).

1.1 Critical studies of adaptation

As climate change adaptation is the latest moment in the continually morphing development regimes, I have turned to critical policy and development studies to understand this phenomenon. Primarily, these studies informed the questions I asked about the KAP and the manner in which I asked them, though they also contributed to understanding the answers.

I draw from Peck and Theodore (2010a) new critical policy studies. This research area has broken from older, heterodox policy transfer studies which assume policies flow seamlessly from one place to another in an open, rational market. Like my research, this new field of critical policy studies uses anthropological and sociological methods to focus on mobile ideas and technologies through circuits and what the transformative effects of these movements are. I assume that policies transform in their journeys and are subsequently transformative in their effects. While the travelling policies might represent universal visions and ways of diagnosing

and treating ills, the policy medicine is always incompletely and unevenly successful (Mitchell, 2002; Peck, 1999; Peck & Theodore, 2010a). An adaptation project, for instance, diagnoses climate change (alongside underdevelopment, for example) as the problem, with the project, such as the KAP, as solution.

The outcomes of mobile policies, on the ground, therefore, are locally specific, mutating and hybrid practices. Larner and Laurie (2010) investigate how policies are embedded in the practices and imaginaries of travelling technocrats. Like Larner and Laurie, I value the biographies of this transnational policy elite; this reveals how positionality influences the way in which policies travel through networks, producing diverse and contested outcomes. Similarly, Peck and Theodore (2010b) examine the processes through which, and outcomes of, conditional cash transfers – the best-practice policy development – as they move between Mexico City and New York City. In contrast to Sheppard and Leitner (2010), who observe that policies of 'global capitalist governance' continue to be blindly disseminated from the Global North to the Global South, Peck and Theodore (2010b) find that in the presence of compelling evidence by way of statistics, policies can mutate northward.

The production of knowledge – statistics, but also reports and economic theories about development paradigms – is also a key juncture on which this thesis concentrates, as this knowledge is integral in sustaining the globalising imaginary of these policies (Peck & Theodore, 2010b). Hybrid microfinance policies are examined by Roy (2010) in several of their natural habitats. Integral to Roy's analysis are the parallel circuits of truth and finance which sustain the ideals of microfinance as a mobile policy, whilst the policy practices hybridise in their journeys in Washington DC, Bangladesh, Egypt and Lebanon, and in between and back again. Despite their disparate practices on the ground, these circuits of truth maintain unitary

policy. Goldman (2005) also examines these circuits of truth; the production of scientific knowledge as cogs in a machine that continually sweeps areas of expertise into its collective.

Investigating the processes of translating policy and political demands into practices between and amongst donors in Kiribati and the KAP, as Mosse (2005) does, is also primary in this research. Mosse (2005) explores successes and failures and the gaps between policies and practices in a development project in India. Like Roy (2010) and Peck and Theodore (2010b), Mosse examines how the practices in actual places diverge from their policy prescriptions. Mosse asserts that despite diverse policy expectations and demands, practices on the ground, largely stay the same. Success and failure, then, is simply a matter of how well the practical outcomes of a project are articulated – again, the work of statistics and development models – against policy goals.

In short, policies diverge in different contexts. Policies deserve to be researched in the diverse spaces they are received, because the policy as it arrives and the practices through which it is formative are always varied. Policies mutate as they travel and as they land; they differ in spaces, but they also differ across scales, from the policy circles from which they emerge to the implementation practices on the ground. Climate change adaptation is not just a policy; it replicates a long history of development projects. Given the continuities between development practices and adaptation practices, it is worth analysing projects such as the KAP amongst a long history of colonialism and uneven development, as critical development studies suggests (see Harris (2008) for a review of these connections).

A second literature that I draw upon concerns the overflows from expected outcomes of these schemes. This insight stems largely from a central question in political ecology and critical

development studies: what are the effects of this project or policy and what work does it do? In his seminal book *The Anti-Politics Machine*, Ferguson (1994) examines a development project in Lesotho. Many assumptions about the place are required in order to implement the project; defining Lesotho as a Least Developed Country enabled the rural development project. Lesotho as LDC was the framing of the problems, in order that the project is prescribed as the solution. But Ferguson's primary focus, like Mosse's (2005), is understanding the project not in terms of its overwhelming failure as assessed by the project goals, but rather its many and far reaching 'side effects' or instrumental effects. Thus, the development project at hand enabled the expansion of bureaucratic power into a previously inaccessible region of Lesotho.

A final yet major informant for understanding projects, the expertise that sustains them and their unintentional overflows, is Mitchell's *The Rule of Experts* (2002). Mitchell examines numerous schemes for social and economic change in Egypt in the twentieth century. Strategies for modernist progress in Egypt, such as the building of an Aswan dam, had effects beyond the construction of a dam. The technical practices – engineering, economic assessment and statistics – required for building the dam produced discursive framings of the problems of Egypt. Through these calculatory practices, a process of othering occurs which produces nature in opposition to rational, scientific process. Simultaneously, these technocratic processes bring the economy into being:

> the idea of 'the economy' provided a mode of seeing and way of organising the world that could diagnose a country's fundamental condition, frame the terms of its public debate, picture its collective growth or decline and propose remedies for its improvements, all in terms of what seemed a legible series of measurements, goals and comparisons (Mitchell, 2002, p. 272).

Technical, grounded, and day-to-day practices can produce particular framings of the world and its problems, which allow specific measures to address the problems. These framings and their remedies always have overflows; for Mitchell, nature always fights back.

1.2 Research questions

Critical policy and development studies suggest particular methodologies and invite key questions of interest. These studies themselves are framings, pointing to particular key questions and diagnoses of the research problems. Methodologically, these studies propose a particularly grounded approach; following policy actors and projects either as they move from place to place or as they attempt to embed themselves in locally specific practices. However, this methodological preference values interrogating the globalising, transnational and transformative policies and imaginaries. Grounded practices must be tested against and held in parallel with ideological policies (see for example, Burawoy (2009)). It is a process of iterative articulation between the ambitions of global policies and their grounded practices; so how do these articulations take place? And what work do the globalising policies do, in framing particular practices as solutions to problems? Other key questions that are suggested by this area of study relate to the overflows from these framings; what work do these framings do? And what are the unintended effects of projects, practices and policies?

In the thesis that follows I inject these interrogations into a climate change adaptation project. My research questions are drawn from critical policy and development studies. But they are applied to a novel body of policies and projects – the climate change adaptation project. In particular, I ask:

1. What work does climate change adaptation do as an organising principle for a project?

2. How is climate change adaptation as a policy articulated into grounded practices?
3. What are the unintended effects of a novel climate change adaptation project in an archetypical vulnerable place?

These research questions are critical in understanding the potential for adaptation as a response to climate change. Kiribati and the Kiribati Adaptation Project is an original site of experimentation in adaptation and it is formative in the wider collective of projects that are beginning to shape a climate change adaptation paradigm within the World Bank, the financing and implementing agency. Kiribati is also extremely vulnerable to the effects of climate change; successful adaptation there is essential. As a result, the KAP is both a critical case study for understanding the creation of climate change adaptation as a policy and project, and also for understanding the potential for, and extent of, coping with climate change in Kiribati.

1.3 Bringing it together

My field research was a process of 'studying up' (Goldman, 2005; Roy, 2010). I examined the ecosystem of consultants and high flying government officials which revolves around attracting and dispensing projects, and increasingly climate change adaptation ones. Yet in many respects, this research was also a matter of studying 'across' as I am also an organism in this ecosystem. I produce knowledge in the same established institutions and read the same journals. When visiting Kiribati, I also met with the same government officials as these consultants do, often on their recommendation. I arrived on the same flight, frequented the same restaurants, and stayed in the same hotel as all of the international consultants. Mary's Hotel is a key site in Kiribati for this consultant and project ecosystem; from their restaurant or air-conditioned lobby, one can observe who is flying in and out of Tarawa, the capital of Kiribati. Consultants trickle in after the flights arrive, and drift in and out of the hotel for the several days or week that they are in

Kiribati. Although I stayed for a little longer than most, I too resided at Mary's (though in part to capture a glimpse of this ecosystem). One night as I ate dinner in Mary's Hotel, I met with a lively group of diverse consultants from the World Bank and the Asian Development Bank. This group proudly proclaimed themselves 'mercenaries, missionaries and misfits'; reflexively embracing and responding to many of the criticisms levelled at them from people like me. Later in my visit, at the same hotel, I had dinner with a British school teacher who for some time has worked at one of the Catholic Schools. He is a geography teacher, and when I told him that I too study geography he replied: "wait, let me guess. Climate change adaptation, that's your research. Everyone who comes here is studying climate change adaptation" (28 May, 2010). These events show how embedded I am in the development-climate change industry that I research in this thesis; this analysis is not conducted at much distance.

Based on these observations, I answer the above three research questions in three chapters. In chapter two, I outline the context in which the Kiribati Adaptation Project lives. I analyse current research about climate change adaptation, I introduce the KAP, and I introduce Kiribati. I show that Kiribati has been subject to numerous framings in its recent history that exist alongside each other. These framings produce specific understandings of problems in places, and are prognostic, prescribing certain solutions.

In the third chapter, I observe that the KAP was focused on producing technical reports and technical expertise. This was apparent from talking with KAP managers about the project focus and from meeting with those fulfilling project components. For the most part, the project was 'rolled-out' by i-Matang (the Kiribati word for foreigner) consultants writing reports and measuring change. Here, I analyse why this is the case and what some of the effects of this are. I argue that in creating this enormous calculatory apparatus, the KAP also satisfies several of the

funders' requirements of experimentation in climate change. The KAP is not only climate governance, as adaptation *frames* project practices. By participating in the KAP, consultants, funders and other i-Matang relatives of the project gain expertise in the novel, and increasingly lucrative, arena of climate change adaptation. These calculations benefit those 'giving' the project at least as much as those 'receiving' the project.

In chapter four, I analyse the ways in which i-Kiribati (this is the Kiribati word for its peoples) actors assemble their vulnerability to climate change for widespread audiences.[2] In interviews and when attending conferences and meetings, the GoK and associated officials performed their vulnerability in order to attract attention and funding. The performances played out on various stages and were accompanied by various facts about life in Kiribati. I suggest that these material conditions, matters of fact and performances are brought together in an assemblage that enacts vulnerability in Kiribati. Performances are an intentional strategy to gain recognition for the plight of the low-lying and fragile atoll nation. Of course, officials and public servants have little choice but to perform their vulnerability; the Government of Kiribati depends on the finances that these performances attract. This chapter outlines some of the perils of participating in this adaptation-development complex.

These observations are particular to Kiribati: they are based on my observations and investigations there. But the KAP has been instrumental in extending climate change adaptation projects elsewhere. The KAP is paradigmatic of other attempts at adaptation, particularly those implemented by the World Bank. The challenges that Kiribati faces in climate change are

[2] I analyse the concept of vulnerability in the Kiribati context, but not other key-words, such as resilience, or adaptive capacity. These terms have their own analytical baggage, and there is not space to address them in their complexity, especially since these are not the paradigms in which the KAP positions itself. Importantly, a discourse of resilience was not raised as the goal of the KAP or the GoK climate change adaptation agenda by interviewees.

unique, given its circumstances as a poor, atoll nation. However, Kiribati is an archetypical vulnerable island nation. The case study I investigate here is a critical one, for numerous reasons. Adaptation in Kiribati is critical; climate change will have profound effects on social life. In addition, the KAP is a critical case study as it represents the sites of experimentation in climate change adaptation, where the World Bank has begun shaping its expertise in this new project paradigm. Even though the thesis that follows is focused on Kiribati, I believe the conclusions reached herein are relevant for climate change adaptation beyond this distinct setting.

Climate change adaptation poses a conundrum. On the one hand, some researchers argue that adaptation is much more feasible than mitigation for addressing climate impacts (for example Pielke et al. (2007)). On the other hand, to implement adaptation is almost to admit defeat, to admit that mitigation efforts will not succeed. The site of the KAP also demonstrates the asymmetries of mitigation and adaptation policies. Those financing the KAP (Australia and New Zealand, as well as the Global Environment Facility) are producing the greenhouse gases that put Kiribati in danger, yet respond by funding adaptation elsewhere. The impacts of climate change will be most profound in the global South, even though these impacts are caused by industrialisation and land use changes in the global North. Adaptation, therefore, is an attempt to fix the problem of climate change somewhere other than where it is caused; in vulnerable places such as the Republic of Kiribati. Both historically and at present, Kiribati barely contributes to global emissions, but will feel the effects of climate change, such as sea level rise and changing patterns of precipitation. While Kiribati is not responsible for its need to adapt, it is also the place least able to cope with this externally imposed threat. But even if profound and serious efforts to curtail greenhouse gas emissions are made, some level of climate change is inevitable due to lag-

times and the long lives of greenhouse gases. Some adaptation (an assortment of modifications to cope with climate stimuli (IPCC, 2007a, p. 6)) to these climate changes is necessary.

2. **Understanding and interrogating climate change adaptation**

This chapter sets the background for those that follow. I briefly outline the climate change phenomenon and its consequences and effects in the Republic of Kiribati. In doing so, I present data about Kiribati that is important for understanding the challenges that climate change poses. By presenting Kiribati in this way – as a series of key descriptions and statistics – I, like many before me, necessarily frame Kiribati. In a brief thesis, I cannot possibly do justice to the complexities of the place, its history and its uncertain future. Previous framings, including those of colonial administrators, aid and development industry consultants and bureaucrats and other researchers, have been unforgiving. They cast Kiribati as a place of "lacks": lacking educational assets, health and other infrastructure, economic opportunities and goods. In recognising my framing as simply one of many, and in trying to make mine a generous one, I hope to avoid some of these pitfalls. I aim to show that Kiribati is not only a series of statistics, vulnerabilities and lacks.

Following these descriptions of Kiribati, and the effects and impacts of climate change there, I present the Kiribati Adaptation Project (the KAP). I review the current research about climate change adaptation. I observe that the proliferating literature about climate change adaptation occurs at some distance from adaptation projects themselves; instead suggesting, categorising and analysing potential, or hypothetical, adaptation options. These studies operate at a theoretical scale; for instance, suggesting adaptation might involve a national adaptation plan, but not investigating what this plan would include, which actors would be involved, how it would become operational, or what its flow-on effects might be. Such a body of literature cannot help answer critical questions such as: what are the effects of the KAP; and how does it operate

in practice? Neither can this climate change adaptation literature significantly assist the KAP in its practical endeavours.

However, analytical means exist for understanding adaptation projects. I draw on several authors whom I crudely categorise as critical policy and development studies analysts. These authors provide theoretical tools for understanding and thinking about adaptation projects. They also provide insights into methodologies – the types of questions that might be worth asking of such projects and how one might go about asking them. Drawing from these methodological insights, I outline the field based research that I conducted in Kiribati.

2.1 Climate change

According to the Intergovernmental Panel on Climate Change (IPCC) – the scientific body established in 1988 to provide independent advice to the United Nations on climate change – "warming of the climate system is unequivocal" (IPCC, 2007b, p. 2). The climate system is driven by, amongst other things, the atmospheric concentrations of greenhouse gases (GHGs), especially carbon dioxide (IPCC, 2007b, p. 2). Increases in fossil fuel use and land clearance since the Industrial Revolution are responsible for the large increase in atmospheric concentrations of CO_2: in 2011, mean global concentrations of CO_2 exceeded 390 parts per million (Scripps, 2011). Increased concentrations of atmospheric CO_2 and other greenhouse gases leads to capture of more outgoing planetary radiation, which climate scientists refer to as positive 'climate forcing' (other factors can lead to negative climate forcings, like volcanic aerosols), in turn warming the earth's atmosphere, land and ocean (IPCC, 2007b, p. 2). Crudely, greenhouse gas emissions lead to positive climate forcing which lead to global temperature increases. The IPCC concludes: "there is very high confidence that the net effect of human activities since 1750 has been one of warming" (IPCC, 2007b, p. 2).

Expected temperature increases relative to 1980-1999 as a result of the continued emission of GHGs are between 1.1 and 6.4^{o}C by 2090-2099 (IPCC, 2007b, p. 2). Temperature increases cause sea level rise through ocean thermal expansion, glacial melt and changes in terrestrial storage (Dasgupta, Laplante, Meisner, Wheeler, & Yan, 2009). The IPCC projects average sea level rise by the end of the century between 0.18 and 0.59 metres relative to 1980-1999; however, these projections are considered conservative as they do not consider the full effects of melting ice glaciers (Rahmstorf, 2007). Nicholls et al (2011) suggest that average warming by 2100 of four degrees will result in sea level rise of between 0.5 and two metres, with greater effects beyond 2100. Other climatic changes caused by temperature increases include changes in the patterns (including frequency and intensity) of precipitation events, extreme events and wind (IPCC, 2007b, p. 2). There are complex and distinct regional distributions of these changes; for instance, precipitation increases are predicted in high latitudes compared to decreases in subtropical regions. These myriad changes caused by global temperature increases in turn pose novel risks to ecosystems.

While these projections seem relatively assured, in fact there is much embedded uncertainty at various scales (Barnett, 2001). These are projections of the future and can only predict with probabilities what might happen: there is no way to know all coordinates of the future (Boykoff, Frame, & Randalls, 2010). There are also limitations to predicting how humans are going to act when faced with these challenges; will they mitigate, adapt, at what scale and to what extent? But there are further uncertainties relating to the precise magnitude, timing and location, as well as the interactions between processes and ecosystems (Barnett, 2001). Consider projections of sea level rise. At the global scale, sea level rise estimates require predicting dynamical ice-sheet processes, a method for which is unresolved (Nicholls & Cazenave, 2010).

Using empirical observations to extrapolate leads to estimates that vary by more than a factor of three (compare (IPCC, 2007b, p. 2) with (Pfeffer, Harper, & O'Neel, 2008)). At the regional scale, uncertainty is intensified by regional climatic patterns, with complex and unknown relationships with climate change. In the equatorial Pacific, for instance, a major driver of annual climatic conditions is the El Nino/Southern Oscillation which affects sea surface temperatures and levels, and wind and storm patterns. At the local scale, sea level rise also interacts with local coastal conditions, depending on hydrodynamics and coastal morphology. For instance, sea level rise depends on the complex reactions of corals to increasing ocean acidity and temperature in atolls, which in turn depend on coral reefs for wave and storm protection (Donner, 2009). Across these scales, interactions and effects are nonlinear: even with the same temperature projections, the consequential sea level rise projections are wildly varied.

Perhaps one thing is certain: the effects of climate change will be unevenly distributed within and between places (Adger, Paavola, Huq, & Mace, 2006). Inequality exists at almost every scale and place in the climate change conundrum. Even if one ignores the differing abilities of people, places and ecosystems to adapt to climate change, outcomes will be diverse. Actions taken to address climate change also contribute to the uneven distribution of effects. A place's, people's or ecosystem's ability to adapt to the impacts of climate change also effects how severe these changes are: a fifty centimetre sea level rise in one place does not pose the same risks as in another place. There is unevenness in climate impacts as well as how these changes are received.

2.2 Kiribati

Climate change policies, like all policies, have been repeatedly framed and reframed (de Boer, Wardekker, & van der Sluijs, 2010; Noy, 2009). Frames are interpretational, or perceptual,

lenses that guide the identification of key issues and offer solutions (Bickerstaff, Lorenzoni, Pidgeon, Poortinga, & Simmons, 2008; Pidgeon, Lorenzoni, & Poortinga, 2008); they are organising principles that offer particular interpretations of a problem or situation (de Boer et al., 2010). Studies of environmental policy framings are rife, discussing how solutions to environmental problems become dominant (Bickerstaff et al., 2008). These studies have proliferated in response to climate change too, analysing or proposing particular frames to communicate the extent of climate change to different audiences.

Yet a climate change policy – especially one as all-encompassing as the Kiribati Adaptation Project – is also a framing. A climate change adaptation policy is a prognostic framing: it identifies a sole problem – climate change – and offers a lens through which to propose solutions. Climate change, however, is only the latest framing through which Kiribati is seen. Kiribati is still framed through historical events: the Battle of Tarawa and welcoming in the Millennium. The following section introduces the lineages of these framings, including the most recent climate change framing. I also aim to trouble, or question, these framings by adding complexities. These historical pieces help to clarify the puzzle that climate change poses in Kiribati.

2.2.1 The Battle of Tarawa: Colonial histories

Some recognise Kiribati as the site of the notable historical event, the Battle of Tarawa. Fought between Japanese, American and i-Kiribati troops, the Battle of Tarawa was one of the most deadly of World War Two. The northern Gilbert Islands were taken by Japan in 1941. In November 1943, American soldiers arrived in Betio, outnumbering the Japanese approximately ten to one. All Japanese soldiers, except one, were killed in the 76-hour battle that ensued. This was despite some errors on the American's part, including mis-predicting the neap-tide and thus

being stranded on the reef flats as a target for the Japanese and over-burdening foot soldiers with weapons so that many drowned in their attempts to reach land.

The lineage of this bloody event is complex; much more complex than many recognise when historicising Kiribati through this lens. The effects of the battle are also widespread, as I explore in this section: after the war many services were concentrated in Tarawa, an outcome that contributed to the Independence movement in Kiribati. The roots of the battle are as follows. The western string of islands – the Gilbert Islands – of Kiribati has been settled for over one thousand years, it is thought, by people from Melanesia (Thomas, 2003). This group of islands, along with (the now named) Tuvalu, were seized by the British, becoming the British Protectorate of the Gilbert and Ellice Islands in 1892. The British justified this action at the time, claiming it was to protect citizens from the 'blackbirding' of other competing powers in the Pacific region (Macdonald, 1982). Two other strings of islands – the Phoenix Islands and Line Islands – joined the Protectorate along with the raised limestone island, Banaba, approximately a decade later (see Figure 1 Figure 1for a map of the Republic of Kiribati).

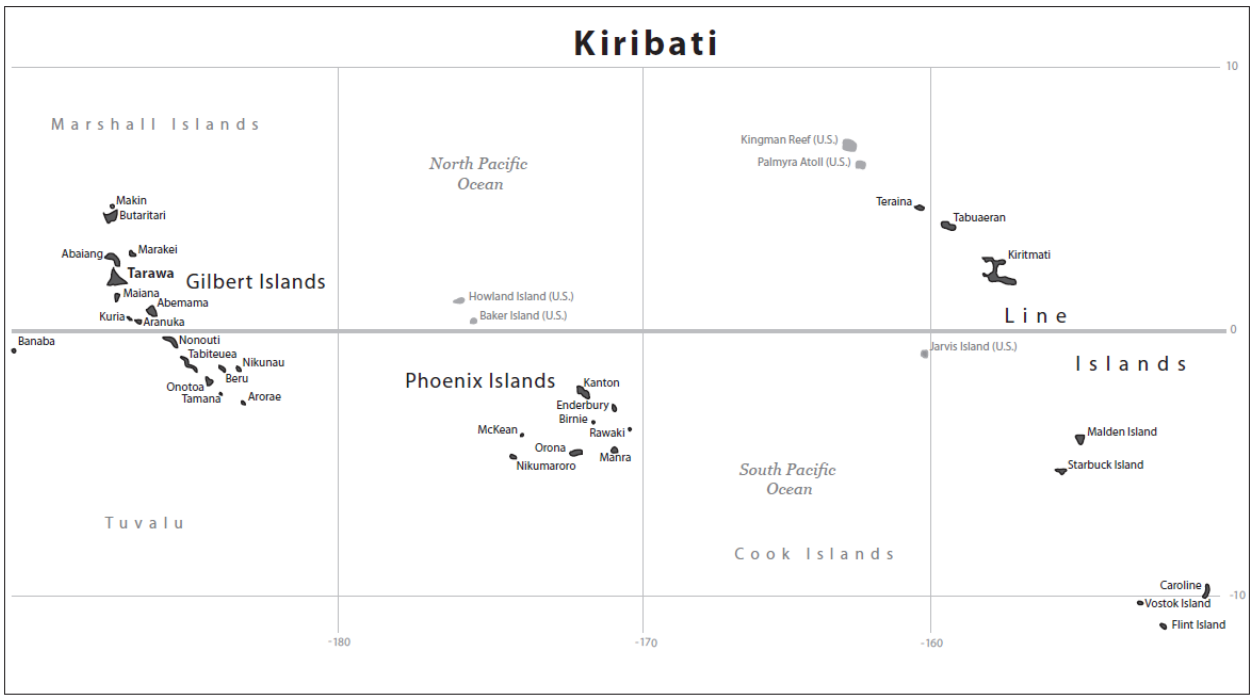

Figure 1 Map of Kiribati

The colonial relationships between the British and i-Kiribati subjects are reflected in the names given to this place, Burnett (2005) suggests. The name 'Gilberts' was given to the western islands in the 1700s by a European ship; the name denoting discovery. Gilberts was also adopted by the indigenous inhabitants, but transformed to Kiribati (pronounced 'Kir-i-bas'). "The name stands just as much for colonial domination and imposition as it does for colonised agency and resistance" Burnett (2005, p. 97) argues. While the signifier 'Gilberts' (taken up by the British) signifies domination and ownership in that it replaces the traditional name, Tungaru, the indigenised 'Kiribati' represents agency and resistance on the part of apparent colonial subjects. The indigenous name, Kiribati, both looks and sounds different – many do not recognise the Gilberts and Kiribati as the same physical places – and perhaps neither do the i-Kiribati people themselves (the Gilbert Islands remains the name for the western string of islands).

The shape of colonial relations was largely determined by a succession of administrators and commissioners (Burnett, 2002, 2005; Macdonald, 1982). Until the discovery of phosphate by the British in the very early 1900s, colonialism focused on creating and enforcing laws, taxation and dispute resolutions (Macdonald, 1982). But the Resident Commissioners Arthur Grimble (in the late 1920s), and Harry Maude (throughout the 1930s), also profoundly influenced the nature of colonial governance. For example, the anthropologically inclined commissioners Grimble[3] and Maude, and the missionaries from other Pacific islands, wanted to only teach the i-Kiribati dialects (Macdonald, 1982). The Commissioners rarely enforced the use of the English language for fear that those who spoke English might use this education for political resistance and unrest, but also to maintain the "primitive Other for its own identity work... for purposes of self-identification"[4] (Burnett, 2005, p. 99).

Banaba (or Ocean Island) was incorporated into the Protectorate in early 1900 upon the discovery of phosphorous on the island. The British Phosphorous Company dominated relations between indigenous inhabitants and colonial administrators on Banaba. The phosphorous deposit contributed to 85% of export earnings during the period of its exploitation, 45% of GDP and 50% of government revenue (Thomas, 2003). So central was phosphate to the functioning of this colonial outpost, that just months after the resource was depleted in 1979, Kiribati became an independent Republic (Thomas, 2003). During this phosphate mining period, the British Government established a trust fund where a portion of the profits were invested. This Revenue Equalisation Reserve Fund (RERF) continues to play a central role in modulating government expenditure and deficits (Pretes & Gibson, 2008).

[3] see his books *A Pattern of* Islands (1956), *Return to the* Islands (1957), both bestsellers and *Tungaru Traditions: writings on the atoll culture of the Gilbert Islands*(1989), published and edited by Maude

[4] It is worth pondering whether this is the pattern replaced by flows of Official Development Assistance and aid bureaucracies in Kiribati.

The trajectory from the beginning of colonisation to independence was advanced by the Battle of Tarawa. Animosity between Ellis islanders (Tuvaluans) and Gilbertese contributed to the push towards independence in the 1950s and 1960s (Macdonald, 1982). During this period, the two groups jostled for importance amongst the ruling parties and public service. Betio, the Western tip of Tarawa atoll was designated as the capital of the colony, but it was only after the Battle of Tarawa that services were concentrated there. Prior to this centralisation, services were dispersed throughout the Ellis islands and Banaba in particular. As centralisation in Betio occurred, differences in language, culture and experience between Ellis Islanders and Gilbertese were at odds. Almost a century of colonial rule undoubtedly exacerbated this rift (Macdonald, 1982).

In Tarawa and other islands, remnants of World War Two still litter the landscape. In Butaritari, the island guesthouse I visited watches over an abandoned fighter aircraft lodged in the lagoon. In Betio, there are Japanese bunkers and tanks and American and Japanese memorials dedicated to the approximately 6,000 people killed. Despite an intriguing and complex colonial history, intertwined with over-exploitation of resources such as phosphorous, the slave trade, and a very recent independence movement, it is the Battle of Tarawa that frames Kiribati. In describing this deadly battle I have introduced some components of this intricate story. Physical scars remain, in Betio in particular, as a reminder of this bloody battle. For visitors to Kiribati, these relics intertwine their histories with local histories. The colonial history is also still remembered, embodied by many in Kiribati. Given their relatively recent independence (1979), many i-Kiribati experienced this change, and indeed, a few current bureaucrats began their public service under the colonial government. It is worth remembering this – and the patterns of power, entitlement and knowledge that colonialism endows – when

interpreting the current regime of development and climate change assistance and how this regime may replicate colonial patterns in the colonial present.

2.2.2 Welcoming Millennium (Island) amidst a complex ecology

Leading up to the turn of the Millennium, the Republic of Kiribati altered the international dateline so that the entire country is now in a similar time zone. Prior to this, the Eastern islands were 22 hours behind the Western islands. Now, rather than being a straight line running along 180^{o} longitude, the international dateline has a slight kink eastwards near the equator so that it no longer cuts through the middle of Kiribati. As a consequence, the Eastern Line Islands – which sit just to the South of Hawaii – are the first to welcome in every new day. The newly named Millennium Island (previously Caroline Island) was the first to celebrate the year 2000 with a widely broadcast party, including traditional dancing, music and fire show (Thomas, 2003). Millennium (Caroline) Island is uninhabited, so the celebration – President and all – was transported there for the occasion. Many now recognise Kiribati as the place for which the international dateline kinks, or that first celebrated the New Millennium.

Underlying this anecdote is the fact that the islands of Kiribati are spread widely across the Pacific Ocean, as shown in Figure 1. This framing of Kiribati encapsulates the remote, vast and spread-out nature of the country. Kiribati is a collection if 33 islands: 32 atolls and reef islands and one raised limestone island, Banaba (the source of phosphorous mentioned above). The 32 atolls are grouped into three strings: the Gilbert Islands, of which the capital Tarawa is one; the unpopulated Phoenix Islands; and the Line Islands, one of which is the largest atoll in the world, Kiritimati. Combined, these atolls have a total land area of 811 square kilometres in an ocean territory of 3.5 million square kilometres in the central Pacific Ocean. This ocean territory is Kiribati's Exclusive Economic Zone, a rich fisheries resource. However, the framing

of vastness and fragility that the following section introduces are not necessarily the way that i-Kiribati people see their islands.

An atoll is formed from carbonated debris from coral reefs which grew upon the rims of previously active (and therefore fertile) volcanoes which have since sunken (Bridges & McClatchey, 2009); See Figure 2 and Figure 3 for diagrams of an atoll). Each atoll consists of numerous islets which surround a lagoon. Atolls are active islands: the reefs on either side of the islets (the ocean and lagoon sides) are continually growing; and the gravel and sand that comprise the land of the islets are constantly being built and rebuilt as coral debris, sand and rock are deposited (Bridges & McClatchey, 2009). Each of these islets typically has a slight slope towards the inner lagoon; the highest points of the islets are on an ocean-ward ridge (Woodroofe, 2008). These ridges reach a maximum height of between two and four metres (Barnett & Adger, 2003): only 34% of the land in the Gilbert Islands and the neighbouring atoll country Tuvalu is more than two metres above mean sea level (Woodroofe, 2008). As well as being relatively low-lying, the islets that comprise an atoll have relatively small land areas, the islets average less than 500 metres in width (Lal, Harasawa, & Takahashi, 2002; Richmond, 1993) and Tarawa atoll is only 30 square kilometres in total area (The World Bank, 2000).

Figure 2 Map of Tarawa

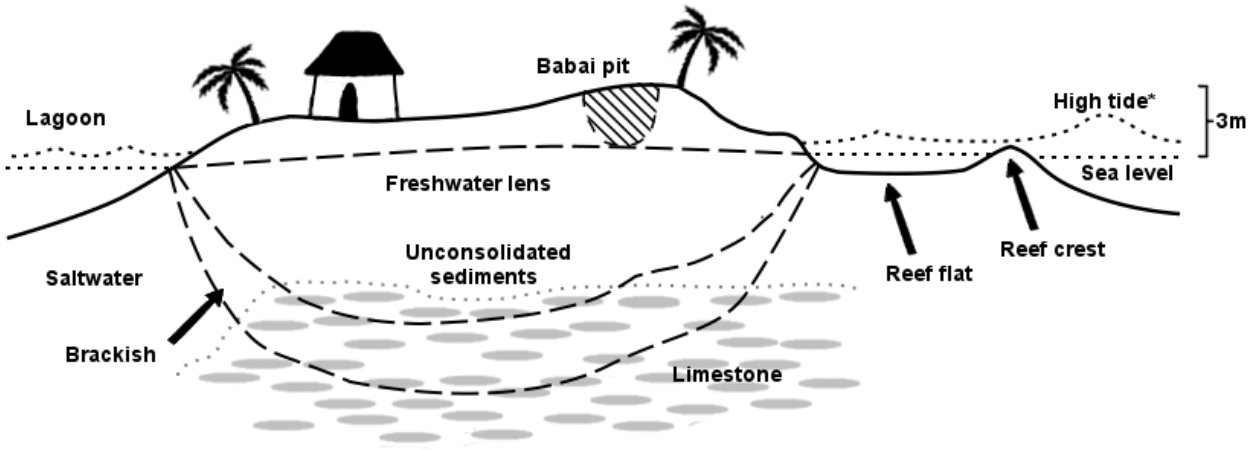

Figure 3 Reef profile

A unique characteristic of atolls is their limited reserves of freshwater. Freshwater arrives in atolls only through rainfall (Bridges & McClatchey, 2009). Beneath the surface of the islets of an atoll are Ghyben-Herzberg, or freshwater, lenses. These unique sources of freshwater are created as rainfall seeps through the thin atoll soil (sand and gravel) and floats above the saltwater below (Bridges & McClatchey, 2009). There is a complex interaction between rainfall and the freshwater sources: "a ten per cent reduction in average rainfall would lead to a 20 per cent reduction in the size of the freshwater lens on Tarawa atoll" (Mimura et al., 2007, p. 689). The size of the freshwater lens is more-or-less related to the size of the islets but topography also matters. For the lens to form at all, the islet must be at least about 300 metres wide (Bridges & McClatchey, 2009). This lens can form as little as 50cm below sea level so that the sole freshwater source for these islets sits just a few metres below the surface. The shallow freshwater is penetrated quickly by rainfall, thus replenishing the water source. However, humans and their waste and the freshwater lens are often separated by only a few meters of very permeable soil; the lenses are susceptible to events such as storm surges, where saltwater can inundate the lens, and also pollution from spills of chemicals and other waste from which it can take many months to recover (Bridges & McClatchey, 2009; Green, Taniguchi, & Kooi, 2007). In some instances the lens is unlikely to recover (unless disposal practices are changed significantly). For instance the freshwater lenses in South Tarawa are no longer suitable for consumption due to high pollution levels in the water.

The complexities of atoll ecologies are absent from framings of Kiribati as the remote and vast country that straddles the dateline and extends across the Pacific. Framings, as mentioned above, shape policy responses. A framing of remoteness and disconnectedness leads to proposals for increasing communication and transportation infrastructure between islands (as

the New Zealand Government has proposed). It is worth noting that descriptions of Kiribati often refer to the countries dispersed, small, and thus challenging environment. For instance, in his controversial travelogue of Kiribati, Troost (2004) describes Kiribati as a country the total size of Baltimore, MD, split into 33 pieces with each flung across the states of continental United States (as this is about the same size as Kiribati's ocean territory). But this is not how the i-Kiribati understand their country. First, the ocean is not simply a formidable place to traverse in getting from one place to another; it is also a source of life and livelihoods (for protection, subsistence, export and trade). I-Kiribati are not traditionally daunted by the expanse of Pacific Ocean. Second, while the ocean is sometimes a material barrier between places, the change in the international dateline suggests a desire for unity and togetherness across the Ocean rather than difference and distance separated by the vast Pacific. In a similar vein, Barnett and Campbell (Barnett & Campbell, 2010), following Ravuvu (1987, 1988) explore how Pacific Islanders do not see their homes as small and isolated islands amongst the vast and obstructing Pacific, but as a sea of islands. The islands amidst an ocean represent an opportunity and a unity rather than barrier and division.

2.2.3 A place of climate change

The third framing through which one might know Kiribati has emerged relatively recently: its extreme vulnerability to climate change. In some respects, this framing draws from, and builds upon, previous framings of Kiribati as 'underdeveloped'. In the last few years, this narrative has been reproduced in newspapers throughout the world. In November 2009, the plight of i-Kiribati people in the face of climate change was front-page news in the Melbourne-based Fairfax newspaper *The Age*. Accompanying evocative pictures of dying coconut trees, eroded beaches and crumbling protective sea-walls, inundated houses, and villagers standing waist deep in water,

Morton (2009) reported that the i-Kiribati are "on the front line of climate change... desperately looking for higher ground." Morton also describes the effects of climate change to be felt in these islands: loss of land; increasingly intense and frequent storm surges; food insecurity. Along with others (Galvin, 2007; Marks, 2008; McDonald-Gibson, 2007), this article outlines key issues related to climate change in the country, such as international aid to help adaptation in Kiribati, and the need for resettlement and migration options. This framing, which occurs now in the public realm – as evidenced by the proliferation of such newspaper articles in recent years – as well as in policy and diplomatic circles represents a new regime in understanding Kiribati and other Pacific Island countries (Barnett & Campbell, 2010; Farbotko, 2005).

One of the non-climatic effects of climate change is the abundance of reports about climate change impacts in Kiribati, filled with projections, distributions and causal diagrams. These reports are sometimes of an academic nature; however, there is also an abundance of reports issued by technical assistants, consultants and government. Importantly, such reports are rarely *in* Kiribati, instead they are *about* Kiribati, produced by foreigners. These reports outline how climate change will affect the current climatic patterns in Kiribati (for a summary see Table 1). According to these projections, temperatures will increase, sea levels will rise, precipitation patterns will change and the intensity and frequency of extreme events will increase.

Table 1 Kiribati climate change projections

	Predictions	*Experiences*
Temperature changes	0.9-1.3^{o}C increase by 2040 (The World Bank, 2000)	Decadel increases of between 0.3 and 0.5^{o}C since 1970s in the region (Barnett & Campbell, 2010)
	1.98±0.41^{o}C increase by 2050s	

	Predictions	*Experiences*
	2.99±0.87^{o}C increase by 2080s (Lal et al., 2002)	
	1.2-5.6^{0}C increase by 2090s (Thompson, Mullan, & Burgess, 2008)	
Sea level rise	23-43cm by 2040 (The World Bank, 2000)	Historical sea level rise 34cm over last 100 years (Simpson & Grosclaude, 2009)
	48-79cm by 2090s (Ramsay, Stephens, Gorman, Oldman, & Bell, 2008)	Historical sea level rise of 2.1mm/year between 1974-2007 (Ramsay et al., 2008)
	12-83cm by 2090s (Government of Kiribati, 2005)	
Precipitation	5.5±2.5 % change by 2050s 7.6±3.3 % change by 2080s (Lal et al., 2002)	
	More unpredictable (Storey & Hunter, 2010)	
	Decrease in annual mean precipitation by end of century (Thompson et al., 2008)	
	Drought characteristics roughly the same over next 100 years, but some periods where drought might be slightly more prevalent. Extreme rainfall events more frequent in 21st Century than previous century (Thompson et al., 2008)	
Extreme events (Due to equatorial nature, there are not cyclones in Kiribati; extreme events are generally storms and droughts)	Storm surges inundate 25-54% of South Tarawa (The World Bank, 2000)	
	Storm surge annual exceedance probabilities (10%) for Tarawa: 10.3cm (Ramsay et al., 2008)	

	Predictions	*Experiences*
	Tide level annual exceedance probabilities (10%) for Tarawa: 2.970m (Ramsay et al., 2008)	
	Storm tide: 3.39m by 2050s; 2.59 by 2070s, compared to 3.03 1980-1999 average (Beca Infrastructure, 2010)	
	Storm tide and wave set-up (ocean side): 3.61m by 2050s; 3.80 by 2070s, compared to 3.31 1980-1999 average (Beca Infrastructure, 2010)	

Risks from climate change are most profound in Kiribati due to existing ecological complexity, and underlying socio-economic vulnerability. The climate changes described in

Table 2 are predicted to reduce access to various natural resources. In particular, more irregular precipitation, extreme events such as droughts and storms, and sea level rise conspire to reduce both the quantity and quality of the freshwater lens. This lens, as mentioned in the previous section, is an integral source of freshwater in Kiribati. The physical limitations of atolls – their low-lying nature, their isolation, their high coastline to land ratio, and their infertile, shallow, sandy and alkaline soils – multiply the effects of climate change. Similarly, predicted climate changes mediate access to natural resources which play a key role in the livelihoods of i-Kiribati people. Agricultural production is expected to decrease, in part due to changes in the freshwater lens, and current fish patterns might change.

Table 2 Ecology of Kiribati

Effects	*Some causes*	*Sources*
Less freshwater	Rainfall variation, increased temperature (evapo-transpiration), increases in sea level (shrinking freshwater lens), extreme events (inundation), coastal erosion	(Mimura et al., 2007; Storey & Hunter, 2010; The World Bank, 2000)
Agricultural production decreases (babai, coconut)	Rainfall variations, sea level rise, extreme events, loss of coastal lands	(Barnett & Campbell, 2010; Mimura et al., 2007; The World Bank, 2000)
Health effects (ciguatera poisoning, diarrheal disease, malnutrition, vectorborne diseases)	Extensions in ranges of mosquitoes and other vectors, increased temperatures, increased sea surface temperatures	(Mimura et al., 2007; The World Bank, 2000)
Tuna fisheries changes	Changes in fish habitats from increased sea-surface temperature, increasing climate variability	(Barnett & Campbell, 2010; Mimura et al., 2007; The World Bank, 2000)
Coral bleaching	Increased sea surface temperature, rising concentrations of CO_2 in oceans, changes in supplies of sediment	(Barnett & Campbell, 2010; Donner, 2009)

Key in demonstrating Kiribati's susceptibility to climate change is statistics about its underlying socio-economic weaknesses. These apparent weaknesses are outlined at length in Table 3 and

Table 4. These statistics are now framed to emphasise how unfavourable social and economic conditions mediate and amplify the expected impacts of climate change. In the past, however, these statistics were used to demonstrate Kiribati's lack of economic prospects –

current wealth is generated by natural resources (copra and fishing licenses); development projects are dependent on bilateral financing; and Kiribati is highly reliant on imported food (such as rice, flour and tinned meats and fish) and fuel – and social problems – including high population growth, overcrowding and poverty, particularly in South Tarawa – demonstrating the dire need for traditional 'development' projects. The ways in which these projects are framed mediates the policy solutions recommended.

Table 3 Social statistics

	Source: Republic of Kiribati Country Assistance Strategy (The World Bank, 2011)	*Source: Other*	*Source: Government statistics*
Growing population	In 2009 population about 100,000 Population growth 1.6%	Population 77,658 in 1995; Annual growth 1.4% (The World Bank, 2000)	2005 population 92,533 Population growth 1.8% (2000-2005) (Kiribati Statistics Office, 2007)
Crowding	About 44% of population live in South Tarawa; 10,000 people live in Betio, land area of just over 1km^2	Growing urbanisation; average annual population growth 3% in South Tarawa (The World Bank, 2000) Population density as high as 15,000 people per km^2 (Storey & Hunter, 2010)	Urban population 40,311 (43.6%) Population density in South Tarawa 2,558 per km^2 (Kiribati Statistics Office, 2007)
Health	Under five mortality 64/1000 in 2008 (highest in region)		
Poverty		50% of population living below national poverty line in 1996 (Asian Development	

	Source: Republic of Kiribati Country Assistance Strategy (The World Bank, 2011)	*Source: Other*	*Source: Government statistics*
		Bank, 2008)	
Education	Near universal primary education	Adult literacy rate 92% in 2005 (Asian Development Bank, 2008)	29% Secondary education; 61% literate in Kiribati and English (Tiroa, 2006) Enrolment rate of 6-15y/r 91%; 20% of population with secondary or tertiary education (Kiribati Statistics Office, 2007)

Table 4 Economic statistics

	Source: Republic of Kiribati Country Assistance Strategy (The World Bank, 2011)	*Source: Other*	*Source: Government statistics*
High unemployment	2/3 of formal employment with government	Domestic employment market only 11% in 1995 (Borovnik, 2005) About 20% population employed (Pretes & Gibson, 2008)	19.8% Work fulltime; 2.9% part-time; 11.3% subsistence (Tiroa, 2006) 22% wage and salary (30% in South Tarawa); 38% unemployed, 24% not active in workplace (Tiroa, 2006) Average annual

	Source: Republic of Kiribati Country Assistance Strategy (The World Bank, 2011)	*Source: Other*	*Source: Government statistics*
			household income AUD8,745 (Tiroa, 2006) Unemployment rate 6.1% (Kiribati Statistics Office, 2007)
GDP/GNI	GNI: USD1,820per capita (Atlas method) in 2009 GDP: USD128,000 in 2009	GNI: AUD1,240 per capital (Atlas method) or US6,230 (PPP method) (Pretes & Gibson, 2008)	
Growth prospects	Average economic growth about 1.1% per annum, but range over this time of -5-6%		
Balance of payments	Imports are 50% of GDP (high reliance on imported food and fuel); Exports only 3%	Export copra and fish (The World Bank, 2000)	
External income	50% of GDP (1/3 GNI) from: RERF (worth AUD570m in 2010); remittances; fishing licenses sales	MIRAB economy – migration, remittances, aid and bureaucracy (East & Dawes, 2009)	Major government revenues: Import duties (AUD17.79m); Fishing licences (AUD30.5m); income tax (AUD12.45m) (National Economic Planning Office, 2009)
Dependence on	Foreign aid 20-25%	External aid was	2010 Budget

	Source: Republic of Kiribati Country Assistance Strategy (The World Bank, 2011)	*Source: Other*	*Source: Government statistics*
development assistance	of GDP, more than AUD40m per annum (AUD20m from AusAID, and others from ADB, EC, Japan, NZ, Taiwan, UN, WB) Government expenditure more than 100% of GDP; Kiribati relies on external assistance for development priorities	AUD62.7m in 2005	expenditure AUD87.52m; expected revenue 68.60m (deficit of 18.92m made up from RERF) (National Economic Planning Office, 2009) Development budget AUD48.86m with AUD7.11m from Government (National Economic Planning Office, 2009)
Dependence on natural resources		80% of population dependent on subsistence from fishing and agriculture and family support for livelihoods (Pretes & Gibson, 2008)	
Infrastructure on coasts		All major infrastructure along the coast (Barnett, 2001)	

2.3 The Kiribati Adaptation Project

Adaptation in Kiribati is vital. There is no doubt that anthropogenic greenhouse gas emissions are leading to the warming of global climates (IPCC, 2007b). Generally there are two actions to respond to climate change: mitigation – which aims to stop climate change by curbing emissions

– and adaptation – which aims to modulate the effects of climate change by altering exposure or sensitivity to the expected changes. Kiribati could pursue either of these options (adapting or mitigating); however their emissions are minimal, as shown in Table 5, and so their attempts to mitigate climate change by reducing their own emissions would have very little effect. Even if global attempts to mitigate climate change are extremely successful and manage to significantly curb emissions, due to the long-life of greenhouse gases in the atmosphere and considerable historic emissions, some climate changes will still occur.

Table 5 Kiribati's and other countries' 2007 per capita CO_2 emissions

	Tonnes CO_2 per capita	*Rank (of 215)*
Kiribati	0.33	181
Fiji	1.76	131
Canada	16.90	15
United States of America	19.07	11

(CDIAC, 2008)

As a response to the multiple threats that climate change poses to Kiribati, the World Bank and the Government of Kiribati instigated the Kiribati Adaptation Project. The KAP builds on a World Bank study, *Cities Seas and Storms: Managing Change in Pacific Island Economies* (2000), which was conducted in the late 1990s. In particular, the fourth volume of this report, 'Adapting to climate change', investigated the threats of, and suggested actions to cope with, climate change in both Kiribati (a low-lying country) and Fiji (a higher country). The report published statistics about the economic impacts of sea level rise: inundation was predicted to cause annual damages of US$8-16m of GDP in Kiribati. The report and these statistics are still widely cited. The KAP built on this report: those who wrote and contributed to the report were interested in building an adaptation project and had gained expertise in Kiribati (interview with

original KAP manager, April 2010). Historical involvement in Kiribati was "a clear rationale for the Bank to continue its involvement in climate change issues in Kiribati" (GEF, 2005, p. 3).

The KAP has so far completed two phases. KAP-I was funded by the World Bank/Global Environment Facility (GEF) and the Japanese Climate Change Fund and was scheduled for 2002-2005. KAP-I had two primary components: National Adaptation Consultation and Mainstreaming; and Project Preparation and Technical Support (GEF, 2005). The first component of KAP-I aimed to complete national consultations and build public awareness, raise capacity to incorporate risk assessment into planning and to mainstream climate change adaptation into economic planning. The second component of KAP-I produced several technical reports including a social assessment, economic analysis, resettlement and land acquisition scheme, environmental and technical assessments and plans of pilot adaptation projects.

Phase II of KAP was funded by the GEF, AusAID (from Australia) and NZAID (from New Zealand). The GEF contributed US$1,899,100, AusAID contributed US$1,490,000 (which financed the freshwater resources component), and NZAID contributed US$1,020,000 for a total of US$6,699,100 (GEF, 2005). The World Bank implemented the project and the KAP serves as a demonstration project for other World Bank implemented climate change adaptation projects.

> "The project development objective ... [was] to develop and demonstrate the systematic diagnosis of climate-related problems and the design of cost-effective adaptation measures, while continuing the integration of climate risk awareness and responsiveness into economic and operational planning... The global environmental objective of KAP-II is to assist the GoK in enhancing its capacity to plan and implement adaptation measures to the climate-related issues facing the country" (GEF, 2005, pp. 3-4).

From the beginning, there were five components of KAP-II: (i) policy planning and information, including awareness raising; (ii) land use, physical structures and ecosystems; (iii) freshwater resources; (iv) capacity-building at the island and community level; and (v) program management. In 2009, however, the scope and geographical location of these projects were vastly reduced due to insufficient progress. After this restructure the KAP focused on freshwater resources, planning and protection in the capital, Tarawa.Table 6 reports the activities undertaken, and some of my observations of these activities. KAP-II was recently completed, and although planning for KAP-III was being undertaken when I was visiting Kiribati, this phase has not yet started.

Table 6 Summary of KAP-II Activities

Component	*Project actions*	*Field observations*
1. Policy, planning and information US$1.17m	i) Awareness raising and consultation ii) Policy coordination and planning iii) Generation of scientific climate risk information	i) Consultations in outer islands, including social assessments, climate change vocabulary ii) Climate risk information reports on sea level rise, wave changes and droughts and rainfall
2. Land use, physical structures and ecosystems US$2.17m	i) Reducing vulnerability of coastlines – public assets and ecosystems ii) Shifting coastal management practices from reactive to preventive and technically varied	i) Focused on planning and pilot coastal protections (sea walls) component ii) Coral reef assessments completed iii) Land use planning component abandoned
3. Freshwater resources US$2.16m	i) Development and management of freshwater resources to reduce their vulnerability	i) Numerous plans and reports produced, including National Water Resources Policy ii) Many remaining tasks grouped together (including water leakages, groundwater assessments, pipe

Component	*Project actions*	*Field observations*
		connections)
4. Capacities at island and community level US$0.55m	i) Technical assistance to Ministry of Internal and Social Affairs to include adaptation in Outer Island Profiles ii) Train local governments on climate risk management and finance iii) Pilot small-scale adaptation investments in Outer Islands	i) Outer Island Profiles completed, other sub components abandoned
5. Project management US$0.39m	iv) Overall support for project management unit under the OB	i) Project management functions, allocated more funds after restructure

Source: Adapted from (GEF, 2009, pp. 7-8)

2.4 Understanding adaptation

At the heart of geographic debate about climate change is a push to investigate adaptation with the same vigour that has been applied to mitigation practices. Hulme (2008a, 2008b) suggests there are numerous reasons why climate policy and research about climate policy is overly focused on mitigation actions. Most obviously, there was a strong emphasis, historically, on mitigative actions within the UNFCCC. But, according to Hulme, the challenges posed when trying to understand heterogeneous mitigation policies (Bailey 2008) are even more spatially differentiated, complex and contingent when attempting to understand adaptation policies. In implementing adaptation, governance actors and networks are complex and challenge traditional scalar assumptions, actions are culturally and socially diverse, and goals are diffuse.

Adaptation is multifaceted and transformative and it deserves critical attention; just like mitigation policies have received. In some respects, this call has already been heeded: "coherent" research about climate change adaptation is recent, but growing (Dovers 2009, p.4). This

research has begun to ask critical questions, including whether future adaptation needs are similar to historical ones, whether adaptation is simply a policy and management problem, and what are its scalar implications (Dovers, 2009). But these questions, and the corresponding answers, are rarely produced in the practical realm where policies hybridise on the ground with historical and current actions and practices. In the following paragraphs, I outline the research to date about climate change adaptation, suggesting it is largely hypothetical and theoretical, rather than ethnographic or practical. I suggest that many of the tools for understanding adaptation exist within critical development studies, and I outline how these studies have contributed to my own.

Adaptation has a relatively recent history amongst international governance institutions. The Marrakesh Accords were established at the seventh Conference of the Parties to the UNFCCC in 2001. These accords establish the financial mechanisms for adaptation in Least Developed Countries, including the National Adaptation Plans of Action, acknowledging the difficulties that adaptation poses in the global South, in terms of access to funding and resources to implement strategies (Adger, 2003; Adger et al., 2006; Huq & Reid, 2004; Mace, 2006). Current adaptation financing includes the multiple Global Environment Facility funding mechanisms – such as the Special Climate Fund, Least Developed Country Fund and Adaptation Fund – and official development assistance and other foreign investment and bank loans (Adger, 2003; Bouwer & Aerts, 2006). At the Cancun COP in December 2010 the UNFCCC agreed upon the most recent adaptation funding: the Green Climate Fund, which aims to provide US$100 billion annually for climate change adaptation projects (UNFCCC, 2010).

Efforts to categorise and characterise adaptation parallel these advances in adaptation institutions, policies and financing (Adger, 2003). The adaptation literature has been preoccupied with defining adaptation. Most begin with the IPCC definition of adaptation: “the adjustment in

natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (IPCC, 2007a, p. 6); older versions are similar). Barnett (2001) describes adaptation as some kind of modification, or change to suit that applies to both ecological and social systems facing climate change. Adaptation occurs in response to both extreme events and gradual, longer-term changes (Barnett 2001) and also occurs to both observed and expected changes (IPCC, 2007a, p. 6). Adger et al. (2006) define adaptive practices as changes in policies or institutions, altering investment decisions, behavioural changes and changes in livelihood decisions. Adaptation can also happen amongst individuals, groups, organisations, or governments (Adger, 2003). While there are varying definitions of adaptation, their differences should not be overemphasised: they all involve some indication of changing practices to cope with altered conditions.

Definitions of adaptation may converge, but there are numerous categorisations of different adaptation decisions which do not. Adaptation can be reactive or anticipatory where anticipatory adaptation can lead to 'lock-in' through investments, particularly large infrastructure projects (Barnett, 2001; Fankhauser, Smith, & Tol, 1999; Huq & Reid, 2004; Schipper, 2007; Tompkins, 2005). Adaptation can be autonomous – that is completely spontaneous – or planned (Smit & Wandel, 2006). Adaptation can be translated into 'mainstreaming' or developmentalism, where climate change projections are incorporated into other decision making processes (Huq & Reid, 2004; Smit & Wandel, 2006). Climate change may also be incorporated into disaster risk management processes in places where extreme events pose the greatest threats (Schipper, 2007; Tompkins, 2005; Tompkins et al., 2010). Adaptation decisions can also be categorised as no-regrets, or win-win; those decisions that are thought to be always beneficial, whether or not climate impacts eventuate and regardless of the timing, location and scale of these impacts

(Barnett, 2001; Smit & Pilifosova, 2003). Projects and policies can be bottom-up or top-down. Bottom-up strategies are those that focus on community-based and driven projects; this strategy aims to avoid bureaucratic delays and technical and resource intensive projects (Fussel, 2007; O'Brien, Eriksen, Sygna, & Naess, 2006; Tschakert, 2007). Adaptation can be widespread or localised; it can be focused on sectors or be cross-cutting (Wilbanks & Kates, 2010). Finally, adaptation strategies may focus on resilience, rather than anticipation or stability (Barnett, 2001). Managing for resilience emphasises flexibility and learning from past adaptive strategies through fluctuations in access to resources so as to be able to respond to surprise and difference (Head, 2010).

While jostling to define and categorise adaptation decisions and practices, arguments abound about what constitutes the better or more successful adaptation strategy. Amongst these categorisations, adaptation comes to be both a process and an outcome (Smit & Wandel, 2006). Resilience is traded off against anticipatory adaptation; the former being somewhat hard to define and to ultimately achieve, the latter being expensive and inflexible. Bottom-up strategies are assessed in contradiction to 'mainstreaming' adaptation decisions. These assessments of adaptation strategies involve hypothetical adaptation practices and climate impacts to estimate the extent to which adaptation may alleviate the effects of climate change (Smit & Wandel, 2006).

Adaptation research lacks empirical investigations of adaptation decisions, and fails to examine the specific, situated practices and processes involved in implementing adaptation strategies. For instance, Adger et al. (2005) attempt to impose three criteria for measuring successful adaptation: efficiency, effectiveness, and equity and legitimacy. These criteria, Adger et al suggest, can be used to test adaptations (but with little guidance as to how) which "should

also be observable in contemporary society" (2005, p. 85). Various places might be fertile ground for using these criteria – national anticipatory plans, the insurance industry and so on – yet nowhere are actually existing policies or practices assessed. Similarly, in research supposed to investigate adaptation strategies in the United Kingdom, Tompkins et al. (2010) simply list adaptation policies they have found in data bases and internet searches, again categorising them as adaptive capacity strategies, building institutions and so on. While these adaptation decisions can be hypothetically assessed as being successful, what actually happens when these policies arrive on the ground, and particularly the tentacles of their diverse effects, remains profoundly understudied. Although such research fails to address how real-life adaptation decisions unfold in specific situations, there have also been few attempts to understand individual actors who are implementing strategies. Amongst these studies, there are no bodies, no active agents. Instead, plans and policies seem to simply spring forward, without recognition that people are required to instigate and implement them. Adaptation studies constitute a design-centric policy discourse: studies of adaptation largely refer to planning, rather than executing, adaptation (Jerneck & Olsson, 2008).

Some studies are empirically focused and grounded in specific communities and social and cultural practices. Tschakert (2007) investigates vulnerability to climate change in rural Senegal, for instance, her conclusions derived from locally produced assessments of the drivers of vulnerability – poor health and a lack of employment opportunities. Similarly, Yamane (2009) assesses what factors come to produce vulnerability in South-eastern Sri Lanka. These contributions are interested in bottom-up assessments of current adaptive capacity, "to document the ways in which the system or community experiences changing conditions" (Smit & Wandel, 2006, p. 285). Yet the adaptation decisions in these studies are still largely theoretical: these

grounded works derive what *could* be done in specific places to help address climate change impacts, based on reports from community assessments and historical adaptations. Thus Tschakert (2007) suggests that addressing health inequalities might go some way to increasing resilience in Senegal.

At the heart of the gaps characterised above and the confounding qualities of adaptation is an adaptation myth. Adger and Barnett (2009) define the adaptation myth as the assumption that adaptive capacity will translate into action. If more information leads to better action – as the adaptation myth suggests – then hypothetical adaptation actions which are shown to be successful translate simply into successful practices on the ground. This adaptation myth drives continual emphases on generating more detailed scientific projections and other technical information which will increase adaptive capacity and assist adaptation decisions. The logical end to this fallacy is that if we have the information then we will know what to do. If we know climate change, then adaptation will automatically follow. Of course, scientific projections and hypothetical adaptation models aid adaptation decisions. But practical questions are also vital: what transpires when these adaptation projects hit the ground; how do they transmute in these local settings; and what else happens alongside these projects?

2.5 Methodology

In order to answer these questions, I visited Kiribati for six weeks in May and June 2010. I conducted 69 wide-ranging and long interviews about climate change, adaptation and the KAP (see Table 7); I observed World Bank managers and technical consultants in their work environments; I attempted to position myself within the expatriate community; and I visited outer islands. I jumped at every opportunity I could, even if it was seemingly unrelated to my

research. My research technique was purposefully ad-hoc: it was informed by a desire to conduct generous research, among people with whom I did not always agree.

Table 7 Interview locations and description

Location	*Interviews with officials*	*Interviews with households*	*Total*
South Tarawa (recorded)	28	0	28
South Tarawa (not recorded)	18	0	18
Abemama	2	5	7
Butaritari	4	8	12
North Tarawa	1	3	4
Total	53	16	69

The overarching strategy of my research was to understand the KAP in its natural habitat and on its own terms, or at least the terms of its employees and associates. In strict methodological terms, this was a descriptive study – it focused on describing a phenomenon, but using deep descriptions. I had ideas about the questions my research wanted to answer, including: investigating the links and shifts from development projects to climate change adaptation projects, and examining climate change adaptation as a governance scheme. Quite simply, I landed in Kiribati wanting to understand what exactly this project was doing, using past studies of development projects and policies to inform my interests and lines of questioning. As such, this research was not an explanatory, but exploratory study: I did not seek answers to distinct and pre-formulated questions.

Similarly, this study was cross-sectional: the consultants, government officials and others were interviewed at approximately the same time. However, during these interviews many described past actions – of the project, themselves and others – and reflected on future

happenings. These temporally varied reflections provided a longer history than many cross-sectional studies, with caveats about the accuracy of memory. That said, clarifying temporal variation was the component of research I found most challenging. When interviewing i-Kiribati people – with translators or in English – I often found it difficult to ascertain whether the informant was describing something which had happened long in the past, recently, was currently happening, will be happening sometime in the future, or was just a longed-for event. Interviews often dwelled on this for some time.

My research style had ethnographic intent, although it was limited to six weeks of observations. I absorbed as much as possible what was happening around me. One of my key research techniques was spending time with my ears and mind open in Mary's Hotel. This hotel is where most consultants who come to Kiribati stay and where many expatriates dine. I had many conversations and met many interesting people whilst simply waiting, reading a book, or fiddling on my computer in the concrete and plastic un-ventilated dining patio. It is a relatively small hotel and many visiting it are alone or looking for company in the small amount of free time they have. From this vantage point, I could determine who was visiting the country, who they were working for, and what they were aiming to do. This strategy meant, for instance, that I was able to meet with the KAP managers, who were otherwise difficult to pin down when contacted. In one case, simply by being in the right place at the right time, I was invited to attend an all-day World Bank workshop where technical assistants and local employees presented their last six months' research. International flights arrive in Kiribati four times a week (though two of these are rarely used by i-Matang visitors, as it is a flight which makes a stop in most Pacific Islands on its route). Each time the plane touched down, a new group of consultants arrived; from observation, about half a dozen a flight. I also positioned myself within the small

community of expatriates (primarily volunteers and foreign bureaucrats), who attend High Commission parties, have a weekly Wednesday evening walk and often meet on Sundays for swims and coffee. While the aid and climate change industry are major players and this industry is polymorphous, it was possible to form a somewhat coherent picture over a couple of weeks of whose interests lie where, simply by observing at every opportunity. These observations were recorded in a daily diary.

However, my primary tool for understanding how the strategies and practices of adaptation were and are produced was interviews (see Schoenberger (2007)). These interviews primarily 'studied-up' (as Goldman (2005) and Roy (2010) do). My sample of interest was experts from the KAP management staff (including the local project managers and directors) and the financiers (including AusAID, NZAID and the World Bank). I also attempted to meet with representatives from each of the Government of Kiribati Ministries to discuss their climate change adaptation related work and their involvement with the KAP. In addition, I attempted to meet with each of the international donors with permanent set-ups in Kiribati. A full list of interviews can be found in Appendix A.

Finding these elusive, transnational policy and technical experts required a snow-balling strategy. Firstly, I put word out through my networks of influence that I was travelling to Kiribati. A research associate in Australia put me in contact with a colleague who had spent years in Kiribati, who then fed me endless, crucial, practical information for conducting locally sensitive research and put me in contact with many key informants in Kiribati. I met with these initial contacts and the two KAP managers. When our interviews were completed (and I did this with each successive interview) I asked whether they knew people who might be able to inform my research questions. While I was generally able to meet my desired sample during my field

work time, until my very last day I was still conducting interviews (in fact I did two whilst waiting for my plane to depart). I also conducted several 'Skype' interviews with past World Bank managers from the KAP who were now stationed in distant places.

When conducting these expert interviews, my primary aim was to let the informants speak for themselves. I started interviews asking the informants to talk about their current roles, how they ended up in them, and what had led them to Kiribati. I let interviews take the path the informant was directing. When a topic was exhausted, I pointed to questions about how their work related to climate change adaptation, what they hoped their success would be and what successes they had observed, and the processes through which they formulated their projects. I was interested in their day-to-day practices and the specifics of what they were currently working on. I focused on what the informants knew – their daily practices and goals – rather than the larger organisation they worked for, or other people, for instance. Often the discussion centred on questions I had posed in my 'Information Document' sent in advance of the interview (see Appendix B). Importantly, I had no predefined interview schedule, but instead key topics I wished to address. These key topics also altered during my field work so as to reflect my changing research concerns, as informed by previous discussions. At the beginning of interviews I asked informants for permission to record, in which case I recorded (and took notes), and if refused I simply took notes.

The capital South Tarawa, where I conducted all of these expert interviews, is a very different place from the 32 outer islands. There are far fewer international visitors in the outer islands (though there are still some: during one visit I met an Australian family who were teaching at a high school), and there is a much smaller government presence. There are also far fewer modern conveniences: for instance, there is no permanent source of electricity (only solar

and fuel generators), and rare internet connection or air conditioning, unlike Tarawa. For these reasons, as well as a general discomfort with only learning amongst those who were privileged in Kiribati, I travelled to three outer islands: Abemama, Butaritari and North Tarawa. With translators, I conducted several household interviews in communities across these atolls. During these interviews I was interested in understanding access to diverse resources and how these resources are shared in these communities. I also asked what these households knew about climate change; their observations about climate change; and what they thought should, and could, be done about it. However, I do not specifically refer to these interviews in my thesis, for several reasons. First, because the KAP limited its design, focusing instead on adaptation in the capital South Tarawa and cancelling its outer-island work. As such, there is no KAP-implemented climate change adaptation work in the outer islands. Second, in a preliminary discussion with the project manager and directory, I was asked not to talk to those in the outer islands about climate change adaptation, because they were not receiving the benefits of these projects. To discuss what is happening in Tarawa, it was explained, would be insensitive. However, these interviews still profoundly shaped what I am saying and thinking about climate change. In particular, I have reflected on different vulnerabilities between these outer islands and Tarawa.

Alongside these observations and interviews, I collected secondary sources. Oftentimes during interviews, people would comment on documents they had created and, where possible, I collected these documents. I amassed annual Ministry work plans and business plans for the state-owned enterprises, budgets for the last several years and development plans. I was given the consultancy reports to the KAP that had been published to date and numerous management and assessment reports from the World Bank. On completion of the KAP in December 2010

many reports were posted online on a Government of Kiribati climate change awareness website. These documents are referred to throughout this thesis. Interviews, observations and secondary sources create a methodological pluralism (Yeung, 2007) and provide opportunities to triangulate my conclusions.

Converting these sources into an analysable format and then into the story that follows was a multi-stage process. Whilst in Kiribati I constantly reflected on what I was finding. Even whilst in the midst of field work, I re-read observations and transcribed interviews (from both notes and recordings). This was an iterative process of theory, practice and observation, both in Kiribati and when I returned. Searching amongst the empirical detail I confirmed that two key stories emerge. These two stories follow.

3. **What does the Kiribati Adaptation Project do, and why?**

The Kiribati Adaptation Project (KAP) has so far produced measurements, models, projections, and guidelines for best practices. As a result of the KAP, there are now probability distributions for sea level rise, wave surges and sea level overtopping events; there are data about the exact quantities, depths, and quality of numerous freshwater lenses in islets in the Gilbert Islands; and there are precise design and construction guidelines for best practices pertaining to sea walls. These calculatory and demonstrative 'successes' were articulated in detailed, lengthy project reports. While the purported aim of all this information is to "reduce Kiribati's vulnerability to climate change, climate variability and sea level rise" (Government of Kiribati, 2010a), the connection between extensive consultative reports and successful climate change adaptation is unclear. In two phases, various components, and a project redesign, the KAP has produced project successes and failures, but primarily it has circulated several million dollars.

This chapter explores why the KAP has focused on empirically establishing the extent of, and responses to, Kiribati's vulnerability. I argue that these calculations are required in order to begin to govern - limit, manage and control (Bulkeley, 2005) – climate change through adaptation. Accordingly, climate governance includes attempts to alter the rate of change of climate and also attempts to change the relations between humans and their climate (climate change adaptation). The numerical measurements that the KAP produces are required to facilitate these governance practices. In undertaking these calculations, governing climate through adaptation projects has important and previously unexamined affects.

The argument proceeds in four sections. In section 3.1 I situate the KAP in discussions about climate and environmental governance. Climate change is an assemblage of social relations, 'natural' phenomenon including greenhouse gases, consultants and i-Kiribati

vulnerable subjects. Re-entangling mitigation and adaptation techniques under the title of climate governance considers this collection of actions together, in association with this vast and complicated assemblage. Importantly, situating the KAP as governance invites comparison with other analyses of governance techniques, and their important, but unpredicted overflows.

After reviewing definitions of climate governance, I turn to analyses of environmental governance that concentrate on the overflowing effects of attempts to manage environmental change (as Robertson (2000, 2004) and Mitchell (2002) do for wetland banking and engineering the River Nile respectively). I argue that, like other environmental governance regimes, the KAP is not a neutral strategy for management. Data about climate change in Kiribati created for the KAP is instrumental for the World Bank in attracting future funding (like their other information generating schemes, Goldman (2005)). Further, this information has both material and discursive effects, as I explore.

In section 3.2, I outline three examples that illustrate the extent of the KAP's calculatory regime. These examples offer insights into what an adaptation project consists of, how it works, and how complex it is. In short, they show what an adaptation project does. Following this (in section 3.3) I argue that the KAP calculations dissect climate change into its components of sea level rise, storm surges and increased variability and decreased supply of freshwater resources. Each of these aspects of climate change is addressed separately in the KAP under diverse sub-components and consultancy contracts. Partitioning the diverse impacts of climate change allows the ensuing environmental changes to be governed. In each component, consultants complete calculations, attempting to know and govern climate change and its effects. Adaptation, following this logic, is the sum of disparate and unconnected environmental governance parts. There are clear material effects that result from this assumption. Separating adaptation into

cumulative parts denies the complex, non-linear and unpredictable interactions between these components. Nature defies these categorisations, resisting such governance techniques.

In section 3.4, I demonstrate that climate change adaptation is more than the sum of its parts. The adaptation regime is also an organising principle used to understand the nature of Kiribati's needs, which are to be addressed by international governance institutions. Climate change adaptation is also a label that can be used to attract novel sources of financial support. Thus, the KAP has to articulate itself as an adaptation project, in contradistinction to a 'traditional' development project. Vast calculations of climate and numerous policy documents lend legitimacy to claims that the KAP is exploring new grounds in adaptation techniques and practices. These claims are required for various audiences: the KAP's financial backers such as the GEF; its implementer, the World Bank; and also for the country itself. This is the discursive work that calculations enable.

This is not to suggest that the KAP solely serves the goals of its international governance institution affiliations; these institutions are trying to help Kiribati adapt to climate change and are compelled by the apparent dire vulnerability of the country. However, adaptation to climate change is hard and successful practices to achieve it not yet known. In the gap between the compulsion to act (by policies and humanitarian sentiment) and the absence of known solutions, project governance mechanisms – phases, components, consultants, money and related computational practices – fill the void.

This chapter aims to analyse some of the effects of an adaptation project as it is implemented on the ground. I also attempt to understand why the KAP has proceeded in such a technically focused manner. Quite simply, I want to answer the question: What does an

adaptation project do and why? The analyses here are grounded in project specifics and numerous interviews, but the answers to these questions also relate to institutional processes. The KAP's calculatory practices are as much about establishing information about climate change in Kiribati as they are about articulating World Bank expertise in adaptation projects.

3.1 Environmental and climate governance

In this section I explore definitions of environmental and climate governance. In doing so, I show that the KAP is a technique of climate governance. At its most general, governance implies "purposeful effort to guide, steer, control or manage sectors or facets of societies" (Kooiman (1993, p. 2) in Adger et al. (2009, p. 5)). Governance is a technique through which resources are allocated, and control is exercised (Bulkeley, 2005). The term has also been frequently used to describe decision making institutions or their actions when managing environmental changes, for instance Bakker's (2005) definition of governance as the way in which decisions about a resource are made. In these definitions, governance and government are not contrary, or opposite; "this interpretation suggests a continuum of systems of governing, in which state and non-state actors play a variety of roles" (Bulkeley, 2005, p. 877). Both government and governance have the potential to perform "politics with a small 'p'" (Roberts, Wright, & O'Neill, 2007, p. 968). Climate governance refers to the actions and institutions that manage, control, or steer climate change impacts. The UNFCCC is a key climate governance institution, as it is the central body through which international mitigation and adaptation decisions and policies are made. The UNFCCC attempts to govern mitigation through policies including the Kyoto Protocol which (attempts to) assigns emissions reductions, and thus control future climate scenarios. "The instruments of climate governance started with ideas around carbon taxation and

energy policy and have evolved into the diversity of market-based policy measures" (Hulme, 2008b, p. 425).

I review some discussions of environmental and climate governance in this section. In doing so, I suggest a broader definition of climate governance that also includes adaptation options. This distinction comes from viewing the climate change as an assemblage of greenhouse gases, impacts such as sea level rise, people who flee these impacts, consultants who attempt to manage it, and physical and material structures such as sea walls and houses. I show the KAP is a governance project in order to invite comparison between previous governance projects and the KAP, a contrast which encourages an examination of the effects of governance techniques.

Environmental governance and climate governance involves more-than-governmental institutions, such as the World Bank (Martello & Jasanoff, 2004). Central actors and institutions in the climate governance regime are the UNFCCC and its legal frameworks, including the Kyoto Protocol and its successors the (non-binding) Copenhagen Accord. At the international scale, governing climate impacts also involves non-state actors such as businesses and financial corporations, suggesting that climate governance is not only extra-governmental but increasingly financialised, privatised and market-based (Bailey & Maresh, 2009; Bailey & Wilson, 2009; Bailey, 2007a, 2007b; Boykoff, Bumpus, & Liverman, 2009; Liverman, 2008). There are national and sub-national actors and institutions, including regional emissions trading schemes, or municipal government networks (Bulkeley 2001). There are also various types of actors, including governments, business and financial firms and NGOs; for example, the UNFCCC and the World Bank govern the Kyoto Protocol Clean Development Mechanism and NGOs regulate voluntary offset markets (Bumpus & Liverman, 2008).

Governance also entails new scalar and spatial geographies of decision making (Bulkeley, 2005). Governing climate change requires political processes of scaling and rescaling both the objects of governance as well as the actors. For instance, climate governance is (or perhaps was, given the recent proliferation of regional, national and local climate policies) internationally oriented, reflecting the scientific emphasis on *global* climate change, and so that emissions and reductions can be traded internationally (Bailey, 2007a; Hulme, 2008a, 2008b, 2008c; Liverman, 2008). Climate governance might be globalising – the primary means for decision making is the UNFCCC – but it is also always multi-scalar, creating new geographies of environmental governance (Bulkeley, 2005). While the institutions of adaptation are transnational, such as the World Bank, the subjects of adaptation are often localised communities (Tol, 2005).

So far in the literature, environmental governance signifies "the broad range of political, economic, and social structures that shape and constrain actors' behavior toward the environment" (Bumpus & Liverman, 2008, p. 30). Climate governance, as a subset of environmental governance, refers to efforts that manage or control greenhouse gas emissions in order to manage or control climate impacts, and that operate through markets and networks of multi-scalar and extra-governmental institutions. Notably, climate governance denotes mitigation actions and institutions. Mitigation responses seek to guide or manage climate change, through various governance institutions that aim to reduce greenhouse gas emissions, including the Kyoto Protocol and regional emissions trading schemes (Bailey, 2007a). But both adaptation and mitigation attempt to limit and respond to the effects of climate change: adaptation efforts also attempt to govern climate change, in the same institutions and for the same desired effect. Recently, studies of climate change adaptation have begun to recognise that adaptation requires

governance. For instance, Nicholson-Cole and O'Riordan (2009) suggest that protecting the coastlines of Norfolk, UK, requires new strategic adaptation measures that embrace soft rather than hard engineering options. In order to facilitate this adaptation (to soft engineering), Nicholson-Cole and O'Riordan argue that the foundations of 'good governance' are necessary – including (amongst other things) common visions, coordination and robust science. According to this discussion (and others, including Brockhaus and Kambire (2009), Klein and Mohner (2009)), adaptation itself needs to be governed.

In contrast, I suggest that to *do* adaptation, through projects and policies, is to attempt to govern climate. Adger et al. (2009) only briefly recognise this possibility, suggesting that adaptation techniques involve deliberative actions by interacting individuals and collectives at multiple scales and levels. Analysing adaptation as governance brings comparison with other governance techniques, as well as explaining the modalities through which adaptation occurs. As I outline in section 3.1.1 below, studies of environmental governance show that there are many overflows, or unintentional consequences of these policies, in part because of the necessary simplifications of governance techniques. Comparing climate change adaptation to previous attempts at climate and environmental governance prompts consideration of whether these overflows also occur alongside adaptation.

3.1.1 Governance overflows

Like adaptation actions (see chapter two), governing climate requires work to sustain it, including particular ways of understanding (modelling, projecting, etc) climate. In order to govern climate, it must be viewed and manipulated (made and remade) by governance actors in certain ways. Consider, for instance, those processes broadly collected under the terms neoliberal environmental governance (see Heynen et al. (2007)), a panoply of market based interventions

which necessitates establishing property rights (Mansfield, 2004; McCarthy, 2007; Robbins & Luginbuhl, 2007) to implement processes of privatisation (Swyngedouw, 2005), commercialisation, marketisation and commodification (Bakker, 2005). These processes entail discursive and material abstractions of nature in order to implement reforms.

Studies of the privatization of water are sympathetic to the materiality of flow resources (Bakker, 2005; Bakker & Bridge, 2006), but focus on the negotiations between and amongst institutions and populations. In contrast, Robertson (2000, 2004) explores which scientific abstractions enable making wetlands a commodity, and thus able to be allocated to an owner. Wetlands have to be categorized as supplying certain amenities – e.g., habitat or flood relief – and designated a value for each these characteristics based on quality, size, integrity and so on. Once these values are established, then the wetlands can be swapped and traded. Algorithms formulated by ecological scientists create a total value for the wetlands based on these amenities or characteristics, but wetlands are never the same even when assigned the same total value. In other words, governing environments through neoliberal management tactics, such as wetland banking, not only involves transferring property rights or establishing market competition, but also certain knowledge claims and scientific practices of distilling 'environment'.

James Scott (1998) suggests that simplifications such as maps (or numbers to represent the qualities and characteristics of a wetland; Robertson (2000, 2004)) make a society legible. These simplifications, of course, can only ever present certain aspects of the object they describe; for example, forest can be seen and (importantly) managed in terms of yield revenue, but this neglects the social values of forests, much less their value to other natures, such as animals. Scott acknowledges that "some level of abstraction is necessary for virtually all forms of analysis" (1998, p. 13). But the scientific tables depicting the forest or the cadastral map representing the

territory transform that which they portray. To some extent, and to at least some people, the forest becomes the yield. Nature – forest – becomes natural resources – timber. These abstractions are not merely social constructions, or productions (as in socionature (Swyngedouw, 1999, 2005)) or a new name for a thing which already existed: simplifications do things (Braun, 2002; Mitchell, 2002), although not necessarily the things predicted.

Mitchell (2002) also attempts to understand how expertise affects environments through governance processes. Mitchell focuses on the engineering feats on the river Nile in the twentieth century and suggests that the process of construction helped "produce the effect of a world divided into human expertise on one side and nature on the other" (2002, p. 35). Actions to govern the Nile through dams and hydraulic power themselves created a series of binaries which legitimized expertise and established the river as a "force of nature to be tamed by man" (2002, p. 35). In order to justify this large expenditure there were a

> ...series of proposals, plans, financial statements, political memoranda, annual reports, newspaper accounts, all of which in different ways described, enumerated, calculated and argued about the building of the dam (Mitchell, 2002, p. 36).

This technical expertise was not new, but rather it was a different ordering and more intense concentration of knowledge that later came to be known as cost benefit analysis. Technical engineering always overlooked the persistent unintentional effects (that building the dam facilitated the spread of malarial mosquitoes, for example) "so that the human, the intellectual, the realm of intentions and ideas seem to come first and to control and organize the nonhuman" (Mitchell, 2002, pp. 42-43). Projects to govern nature have unintended effects. In the instance of the massive engineering schemes for the river Nile, governance processes rearranged the human

and the nonhuman so that the latter was to be subject to technical expertise. Certain ways of knowing and operating are required to complete and legitimise the rearrangements (nature as passive, to be governed).

In much the same way, climate governance requires certain ways of delineating and knowing climate, climate change and its impacts. Characteristics of climate governance are not only the participation of non-governmental actors, such as the Kyoto Protocol or financial and business interests, nor is it solely about re-scaling climate impacts. As the review of governance overflow suggests, climate governance also involves expertise not just for quantifying, assigning and trading carbon emissions, but also for making climate predictions and scenarios. As Mitchell argued about the Nile, this technical way of knowing climate change both facilitates and is re-created through project-based management. Furthermore, as both Robertson (2000, 2004) and Scott (1998) suggest, whilst scientific expertise may be technically complex, it is, by necessity, always a simplified explanation for the world, and often nature rebounds (Mitchell, 2002).

Despite deploying managerial and expert-based techniques, governance strategies are not neutral. Swyngedouw (2010) recently emphasized the consensual, non-political and non-democratic nature of governance, especially in relation to climate change. Accordingly, climate change has been elevated to an apocalyptic and globalised problem and in the process is relegated to non- and quasi-state institutional actors and their expert techno-managerial approaches. Consequently, for Swyngedouw, governance is not just about interested non-state actors having influence, but also about banal consensual decision making: governance is politics reduced to policy making. Bulkeley (2005) disagrees: while states may not be the only, or most significant decision-making institution and policy making might be prevalent, the processes of

and participants in governance are inherently political. Governance is political in that it is contested (Bulkeley, 2001) and value-laden and interested (Mitchell, 2009; Roberts et al., 2007).

Producing technical knowledge is also powerful. Michael Goldman (2005) examines how the World Bank has been able to incorporate green knowledge into its neoliberal agenda. Goldman suggests that the World Bank gets its power from its knowledge kudos, its ability to make "its worldview, its development framework, and its data sets the one people around the world choose above others" (2005, p. xv). In particular, the Bank has embraced its environmental and social justice opponents' criticisms and has integrated their concerns into its growing knowledge-power complex. The World Bank achieved this by translating environmental and social fears into a language that is compatible with project based development.

In his exploration of success and failure of development policies and practices, David Mosse (2005) explores how projects are translated or interpreted for varying audiences. Mosse suggests that projects and their practices remain fairly consistent even as their policy goals change. Primarily, projects are about creating management outputs and reinforcing administrative procedures. As such, projects focus on coordinating and producing activities, targets and spending: "social goals [are] also translated into quantifiable outputs, reported as the number of PRAs, meetings, groups or women present..." (Mosse, 2005, p. 112). Whilst projects certainly achieve things – 43 spray pumps, 855 sanitation kits, 45 first aid boxes and so on – these 'development' achievements are also infused with institutional requirements, such as long paper trails of consultancy reports. Success and failure for the development project depends on how well the project can maintain chains of translation between project policies and practices. In analysing success and failure in a development project, Mosse concluded that the project did not change between its characterisation as a project poster-child for its funding agency to one about

to be halted due to its shortcomings. Rather, the policies of the funding institution changed – to emphasise on-budget support, for example – and the project (which concentrated on participatory development) was not successfully translated to meet the funding institution's new objectives.

I position the Kiribati Adaptation Project as a practice of climate governance. The KAP and other project-based efforts at adaptation satisfy the definitional conditions of governance. The KAP attempts to guide, manage and steer climate impacts and their social responses through adaptation techniques (this is climate change impacts and adaptation as a dialectical, socionatural phenomenon). The KAP is a hybrid extra-governmental entity, implemented and financed by a coalition of international governance institutions: the GEF, the World Bank, Australian and New Zealand aid agencies and the Government of Kiribati. The KAP also tests traditional scalar bounds: it is implemented within the state of Kiribati, but circulates extra-nationally with managers in Australia and Washington D.C., consultants from New Zealand, Australia and the United Kingdom; and the model of the KAP is used throughout World Bank networks as evidence of World Bank expertise and experience in climate change adaptation implementation.

Like wetland banking techniques (Robertson, 2000, 2004), or engineering the river Nile (Mitchell, 2002), programming adaptation requires certain knowledge claims. In the following sections I outline three examples of the knowledge produced by the KAP in order to show the extent and nature of the project outcomes. I demonstrate that this knowledge is technical, focusing on measurements and calculations that attempt to delimit climate change into its component parts. Through these details I hope to demonstrate how adaptation actually proceeds on the ground. The descriptions and details contained in this section set the background for the analysis that follows in section 3.3. However, I deliberately include extensive details in this section so as to demonstrate the complexities of climate predictions. I build on these details in

section 3.4 of this chapter, where I examine some of the effects of producing this technical knowledge, the overflows that Mitchell (2002) and Robertson (Robertson, 2000, 2004) have shown. I suggest that climate change rebounds from the separations that the calculations enable; expected impacts do not conform to these technical practices.

3.2 Computing climate change adaptation: projections, models and best practices

During the KAP-I, social consultants undertook wide scale community consultations. The initial goal of these consultations was to establish how diverse communities understood climate changes and what they would want to do about it. In the end, the consultations focused on the former, and the latter – the 'what to do about it' – became the charge of consultants and management themselves. The resulting list of required actions for the second phase of KAP was vast and sprawling, ranging from large infrastructure elements such as building an artificial island from which to harvest water, to small community run and planned projects on the rural outer islands. The variety and extensive nature of these actions mirrors the sprawling effects of climate change. The initial scale and scope of the KAP was not unreasonable, just unmanageable. During the project restructure in 2009 the number and diversity of projects was vastly reduced in order that the allocated funds could be spent and that the project eventually be completed. The project restructure narrowed the focus of the KAP geographically and in scope; essentially Component 4 was abandoned (capacity building and outer island project work) and financial and management resources were distributed throughout the remaining components. All of the community based projects proposed for the outer-islands were left out, including infrastructure investments and capacity building activities (GEF, 2009). As one i-Matang KAP employee mentioned:

> There were 70 different, separate assignments covering a huge range of disciplines from coral to community liaison to building an artificial island... It was completely un-implementable, the ideas weren't stupid or crazy but just in aggregate it was impossible. (Consultant to the World Bank, 15 May 2010)

The KAP-II focused on three components: (i) Policy, Planning and Information; (ii) Land use, Physical Structures, and Ecosystems (with a focus on creating best practices in coastal management and, primarily, sea-wall construction); and (iii) Freshwater Resources (outlining water plans and modelling groundwater resources). Either during the project restructure in 2009, or in the translation of management documents to project practices, the KAP came to be focused on measuring, modelling, planning and managing. This section describes the outputs of the KAP, drawing from one example from each of the three components. These details also demonstrate the KAP's achievements, these outputs outline below are the results of a decade long attempt at climate change adaptation.

3.2.1 Sea level rise projections

The diverse goals of Component One have a common emphasis on "[generating] scientific climate risk information" (Government of Kiribati, 2010a). The two less technocratic ambitions – changing behaviours and attitudes and mainstreaming – have been cast as relatively ineffective (GEF, 2009). But the 'generating scientific information' aspect has been universally regarded as successful: the money allocated was spent, with only brief delays in the midst of a continually extended, never quite completed, project. The (almost) one million dollars spent on this component has bought two series of technical reports.

One series of reports concentrated on assessing current coastal risk management strategies for erosion and flooding and generating risk profiles for predicted "rise in mean sea-level, storm-surges and the potential resultant permanent and transitory inundation of low-lying areas" (Elrick & Kay, 2009, p. iv). In order to complete this risk assessment, an assortment of data was required, including enhanced contour and mapping data. The key recommendations from the report were to continue to ensure that the required input data – contour and mapping coordinates – was available and continually updated for GIS mapping and analysis (Elrick & Kay, 2009). The logic of this technical assistance is that the availability of this data and the ability to analyse it enables climate change risk assessments, which facilitate adaptation planning. In turn, the adaptation planning enables Kiribati to adapt to climate change. However, the translation necessary to turn this information into practices is not always completed.

The other series of reports focused on producing climate scenario projections for rainfall and drought (Thompson et al., 2008) and for sea levels, wave strength and storm surges (Ramsay et al., 2008). This latter report was nominated by several public servants in interviews as being a significant achievement. One public servant vaguely described these outputs from the KAP as successes:

> Q: What do you think are the main successes in climate change adaptation projects?
>
> A: This one [the KAP]... plenty. They have developed a set of vulnerability assessment criteria and tools to date... so they have passed on that, what do you call it, learning. And they are able to use it now. That's one, they did the wave modelling for Tarawa, coastal hazard risk. So plenty [of successes]. (Office of the President, 11 May 2010)

Sea level rise is the least understood and most variable aspect of climate change (Barnett, 2001) and ocean computer simulations produce widely divergent predictions. The General Circulation Models that provide the sea level rise projections are just one source of uncertainty. This is especially the case in the Pacific Ocean where there are also inter-annual variations from El Nino Southern Oscillation events. Furthermore, the intrinsic difficulties related to predicting sea level rise interact with uncertainty in future greenhouse gas emissions. There is yet more uncertainty, as the IPCC Fourth Assessment Report did not consider ice sheet discharge in their scenarios.

Despite these uncertainties, the KAP 'Sea levels, waves, run-up and overtopping' report identifies two predictions for increases in sea level, suggesting certainty where, in fact, there isn't any. Moreover, it specifies exact sea level scenarios – 0.48m increase by 2090-2099 and 0.79m increase by 2090-2099 – for climate risk assessment in Kiribati. The precision in these scenarios elides the inherent uncertainties in sea level rise predictions. The sea level rise projections were also used to make predictions for wave conditions, tide range and storm surges. For example, the 'storm surge' Terms of Reference were highly technical, specifying the need for:

> analysis and estimates of storms surges that accord with the 1%, 2% and 10% annual exceedance probability giving explicit consideration of: the inverse barometric effect; wind stress; and wave set up… for a range of differing island exposures that should at least include: windward ocean shoreline; leeward ocean shoreline; windward lagoon shoreline; leeward lagoon shoreline; and gross differences in reef platform width… for three time horizons (Ramsay et al., 2008, pp. 1-2) .

This report contains a number of calculations: it produced 143 pages of measurements, predictions and models. Figure 4 is just one of numerous graphics in the report; there are 23 similar plots for the different sites examined in the study. It demonstrates the annual exceedance probabilities for wave and storm tide levels for different seal level rise scenarios.

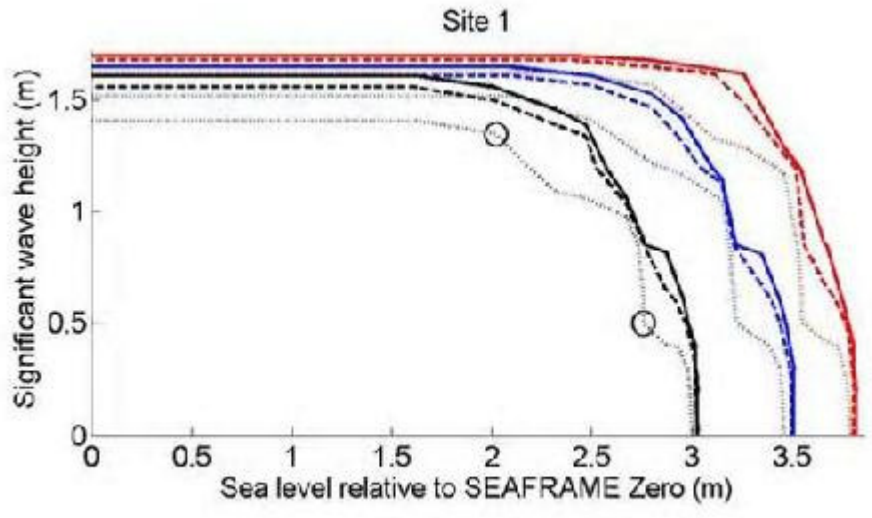

Figure 4 Joint probability distribution of sea level and wave height in Betio (Ramsay et al., 2008, p. 50)

There are also complex equations to establish run-up levels in reef coastlines; they use three different equations depending on the coastal form. For instance, the 2% run-up level is given by the following equations, the Gourlay (1997), Holman (1986) or Stockdon et al. (2006) models (Ramsay et al., 2008, pp. 52-53) respectively as follows:

$$R_{u2\%} = H_r(0.83\gamma+0.2)$$

$$R_{u2\%} = 1.1\left(0.35\beta(H_rL_r)^{0.5} + \frac{[H_rL_r(0.563\beta^2 + 0.004)]^{0.5}}{2}\right)$$

$$R_{u2\%} = 0.64 \tan \beta T_r \sqrt{gH_r}$$

Where:

H_r is the wave height at the toe of the beach

L_r is the wave length of waves over the reef flat

T_r is the mean wave period over the reef flat

β is the beach slope

γ is the Iribarren number

Each of these equations gives varying predictions for run-up levels. In addition, these equations react differently to varying sea level rise scenarios (Ramsay et al., 2008, p. 54).

Suffice to say, the recipients of this consultancy report (the KAP office and Government of Kiribati officers) were unable to incorporate the detailed scientific analysis into their daily practices. The reports were so technically detailed and dense that the KAP management staff required the consultants to write new reports based around two calculators into which i-Kiribati engineers and scientists could plug locational and temporal coordinates, and out of which would emerge sea level rise projections. Coastal experts could also 'input' the required variables including sea level rise scenarios, and the Excel-document-calculators would produce wave conditions, tide ranges and storm surges predictions. The calculators reified complex scenarios in order to be able to act on these predictions.

3.2.2 Sea wall best practices

Whilst Component Two of the KAP – Land use, Physical Structures, and Ecosystems – might sound diverse, it was primarily focused on creating a best practice system for constructing sea walls. The aims of the sea wall best practices are:

> reducing the vulnerability of the coastline including key public assets and ecosystems, shifting the coastal management practice from a reactive, single technique approach to repairing damage as it occurs, to a preventative and more technically varied risk mitigation strategy (Government of Kiribati, 2010a).

This component is one of the two large consultancies that have dominated the latter stages of the KAP.

A large New Zealand engineering firm was charged with creating and demonstrating best practice coastal defences, or sea walls. The engineering firm has prepared "a new set of guidelines specifically developed for Kiribati… and funded by the KAP-II" which were applied in four 'key locations' in South Tarawa (Government of Kiribati, 2010a). The guidelines aimed to widen the scope of appropriate responses to include 'soft options' such as beach replenishment alongside traditional 'hard options' such as sandbags or concrete sea walls. This component offered a variety of coastal protection designs, which the Government of Kiribati were to implement in the future, according to particular choice rules and guidelines.

The Shoreline Protection Guidelines (Beca International Consultants, 2010) outline a sixteen step process for choosing a location, collecting the necessary information about the site (including government records, survey data, photographs and anecdotal evidence), and choosing the appropriate response. Following these guidelines produces 'best practice' sea walls. There is

a lengthy list of check boxes to be completed in the step by step guidelines, encouraging the assessor to note, for example: whether the site is lagoon side or ocean side; whether or not there are existing structures; and whether or not it is a sand beach. Furthermore, the guidelines implore the assessor to take photos, and orange boxes indicate to the assessor that this is a 'Decision Point' (Beca International Consultants, 2010, pp. 8-11). The 'Option Identification Table' requires the assessor to tick whether the chosen option for coastal protection, from the list of five, is appropriate for the energy setting, environmental impacts and for addressing the erosion/overtopping problem (Beca International Consultants, 2010, p. 49).

Site Name: Bairiki – Nanikai Causeway (BNC_12)	Adaptation Options				
Answer the following questions with a tick (✓) or cross (×). If an option has a cross (×) beside any of the questions then the option does not need to be considered further. The adaptation options which answer yes to all of the questions are appropriate for the site. Outline designs should be developed for each option (maximum of two) to provide further information for comparing the options at a later stage in the process.		Soft		Hard	
	Non-structural i.e. move away / buffer	Beach nourishment	Mangrove planting	Seawall / Revetment	Embankment
1 Is the option appropriate for the energy setting of the site? Refer to Appendix 3 for guidance on the energy setting for each adaptation option.	×	✓	×	✓	×
2 Are the environmental impacts from this option acceptable? i.e. increased downstream erosion		✓		✓	
3 Will the option address the problem? i.e. coastal erosion and/or overtopping		✓		✓	

Figure 5 Option identification table, example of check box system (Beca International Consultants, 2010, pp. 8-11)

The goal of this sub-component is not to protect assets, but to design and pilot a better sea wall with a life-span of 50 years. In other words, this is a process-oriented project aiming to alter the way coastal protection is designed and chosen, and not outcome oriented. In order to

determine best practices, the technical consultancy deliberately drew on systematic procedures for assessing problems and designating an appropriate solution. A coastal protection solution (sea walls, sandbags and so on) would become a 'best practice' coastal protection once it satisfied the lengthy check-box-lists, cost benefit analyses and risk assessments. One World Bank manager insisted that this project was about "how we [the World Bank] want you [i-Kiribati engineers] to do it from now on" (World Bank, May 15 2010) and an engineer added "we are giving them best practice coastal management and sort of manag[ing] the risk of sea level rise" (Consultant to the World Bank, 8 June 2010). The sub-component, therefore, was not about protecting the airport from further erosion, even though the beach was, in places, eroding about a metre from the edge of the runway (see Figure 6). Instead, the consultancy designed options that i-Kiribati engineers could implement in the future: the consultancy demonstrated a method rather than the building of actual sea walls. This was also reflected by the fact that, faced with financial constraints, the KAP engineers and managers chose to pay for an i-Matang supervisor to oversee the works and the i-Kiribati labourers on the demonstration sea wall – to ensure the new coastal protections were in fact best practices – rather than paying for a larger, more protective sea wall at a chosen site. Whilst this component of the KAP has not produced statistical models or predictions for climate change and its effects, it has produced engineering models and predictions about which coastal defence solution suits each climate change scenario. Best practice coastal protection contributes to a complementary logic as the computations of the sea level rise predictions. Both of these sub-projects aimed to reorient the processes of coastal management rather than producing solid, infrastructural outcomes (although a couple of sea-walls – maybe two or three – were built, to trial this new 'best-practice' method, and to protect some key assets, much to the dismay of many politicians).

Figure 6 Runway at Tarawa International Airport showing erosion on the ocean side of the runway

3.2.3 Groundwater modelling

The second large consultancy of the KAP sits within Component Three. The major focus of Component Three was fresh water resource assessments and modelling. However, this component also funded national water policies, guidelines for building codes and rainwater harvesting, and some disparate water supply improvements, including reducing pipe leaks. The overarching aim was to improve the sustainability of freshwater resources. A large British engineering company that plied its trade in the Maldives post-2004 Indian Ocean tsunami, has now turned to the Pacific Island atolls, including Tokelau and Niue, as well as Kiribati, to assess various parameters of the groundwater lens (GWP, 8 May 2010). The company recently completed drilling boreholes at various sites throughout the Gilbert Islands in order to compute the thickness of the freshwater lens. The primary aim of these calculations is to understand how the thickness of the groundwater lens changes over time in relation to rainfall, usage and sea

level rises. The company also hopes to use the data it collects about lens depth at various sites in the small islets to model the shapes of freshwater lenses.

In the future, the models and the temporal data might be used to predict a limit for extracting a sustainable yield from the groundwater lens outside of South Tarawa. The groundwater modelling hopes to take the first steps towards replicating the current rationing of South Tarawa's water in other parts of the country. Residents of South Tarawa have three sources of water: well water; piped water from the Public Utilities Board (PUB); and rainwater in tanks. The PUB water is extracted from the lenses of two islets in North Tarawa atoll and piped to those South Tarawa residents who have water connections. Calculating the volume of water that can be sustainably extracted from these two lenses, combined with population projections, led to rationing this piped water. As a consequence, households receive about two hours of piped water every two days. There are plenty of flaws in this model of allocating piped water, including that many people are not connected to the pipe and therefore illegally tap the pipes (which reduces the water pressure and creates leakages) and that the allocation of water is based on the number of households not the number of residents; i.e. each house receives the same amount of water, regardless of the number of residents. Nevertheless, the groundwater assessments hope to produce forecasts for freshwater availability in other islets, a preliminary step in this rationing system.

As well as assessing yield, the groundwater assessments are examining water qualities. Whilst one consultant drilled with a large rig (see Figure 7), another conducted chemical analyses on the qualities of the water extracted. With the information about the quality of the water in the groundwater lens, the consultant provided information to villages about certain practices which taint groundwater (GWP, 15 May 2010). For example, villagers were implored

to keep their pigs and fertiliser away from the areas where they would be extracting water, e.g. a well. Villagers were also instructed not to pump water using mechanical pumps too intensively from a single location as this could lead to saltwater being pumped into the freshwater lens from beneath it. This water consumption advice was grounded in extensive analyses and quantification of water characteristics.

Figure 7 Consultant drilling into groundwater lens

The three examples above – sea level rise and wave strength projections, best practice sea walls, and groundwater assessments – demonstrate the nature and extent of calculatory practices of the KAP. They also show what an adaptation project actually looks like, and the extent of its achievements: reports, predictions and policies. Computational outputs were to inform policies and practices. These activities aim to change the way governance processes function, by adding technical and computational information to future considerations. In the following section I will investigate why the KAP has focused on producing this technical knowledge. I go on to suggest that it is an attempt to establish systems to govern the processes that have come to be known collectively as climate change in order to adapt to them.

3.3 These calculations have implications

Prompted by Robertson (2000, 2004), Mitchell (2002) and Scott (1998), this section examines how climate is governed through these technical practices. I suggest that climate change has to be segregated into separate impacts so that it can be addressed by predictions and policies. Importantly, while recognising that these calculations do work – this is explored in detail in the second part of this section – it is not always the work that is projected. Although climate is reorganised according to these predictions and to fit management techniques, this reordering of climate impacts does not automatically translate into management techniques. Similarly, it is not only management techniques that these calculations work for; in the instance of the KAP, they act almost as advertising for the project implementers' achievements.

In the end, the central components of KAP-II were: sea level rise and wave strength predictions; quantifying groundwater resources; and producing best practice coastal defence construction methodologies. Along with project management methods, these technical practices attempt to bound the separate components of the environment, and environmental changes, that comprise climate change. Delineating and bounding specific instances of climate change are required in order to manage the resources, their changes and the social relations dialectically connected with them. After establishing the bounds of individual components of climate change, calculatory mechanisms are required in order to demonstrate the parameters of expected climatic changes and appropriate responses. That is, project based adaptation schemes require numerical expressions of climate changes in order to 'know' and explain how to adapt to these changes. Once adaptation is individuated into its component parts and these parts are numerically represented, then actions can be taken to respond to, allocate and manage – govern – these changes.

3.3.1 Disentangling and separating through project practices

Project practices – components, consultants, terms of references, budgets, and political jostling – separate out the interlinked elements of that which is to be governed. In short, these actions make boundaries; boundaries between climate impacts and boundaries between experts and non-experts due to their extreme technicality. Each of the components outlined above was undertaken by different consultants and firms from established locations of knowledge (e.g. New Zealand, Australia, the United Kingdom). The components of the KAP had separate goals to be achieved through fixed terms of reference.

When the KAP was assessed as unsuccessful midway through the project, a long-serving (World Bank) management consultant was hired. This consultant had previously worked throughout the Pacific Islands; frequently recounting stories of the different expatriate walking and running groups he had organised in the region, he maintained that the Kiribati Hash Harriers (a running or walking group) was vastly inferior (similar to some of his other Kiribati encounters) to those in Papua New Guinea or Solomon Islands. This management consultant envisioned himself as one of the 'old guard' of World Bank employees; he began in the 1970s when:

> ... it was stuffed with old colonials with experience working in the field, they lived long years in the field and there was a distinct knowledge of what was possible in these places. Now the staff are highly educated and intelligent, but they haven't lived or worked in poor countries. They have not picked up how hard this is (Consultant to the World Bank, May 15 2010).

Yet, the consultant was also sensitive to the fact that the local project workers would not want "another white face coming in to hit them over the head."

This management consultant was hired to guide the two i-Kiribati project managers and directors. He concentrated on their ability to write concise and bounded terms of reference (ToRs) for the consultants:

> The next thing, I ran a course for writing ToRs, how to use them to manage the consultancy. All of this should start with clarity in the ToRs with sets of outputs that are measurable. How on earth were they meant to find 69 consultants for each of the assignments? ... They seem to have been lucky in that they got two of the best.

According to the management consultant, without clear and independent ToRs neither the project nor the consultant know what is to be delivered. The management consultant continued:

> There were 18 different assignments. Two things had been started, the leak detection in Betio, and they had hired... the SWE (water engineer)... But they were all to be separate consultancies. They were very short on management, so I thought, let's bundle it all together into one ToR and get one firm to do it. [We]... sat down and formulated ToRs and collapsed it into one consultancy. We did the same for Component 2 which was for coastal protection and then proposed to drop some of the coastal protection things... This was all very relevant for climate change adaptation, but the PMU [Project Management Unit] were struggling.

As the consultant's analysis shows, making concise guidelines for the components – even if this involves grouping together diverse freshwater objectives – allows the management units to 'manage the consultancy' and push the project forward. Grouping components together, after all,

requires decisions about what belongs and what does not; the ToR is boundary work incarnate. Activities such as a pipe-leak detection program or fixing a pipe along bridge are grouped together and deemed climate change adaptation when it is completed within the KAP, but some other components are excluded, such as installing new water tanks at the hospital or retrofitting gutters on roofs. The ToR is also a key instrument in governance, as it manages how decisions are made and actions undertaken, and by whom.

While there is a desire amongst the multiple donor organizations to work together in Kiribati, coordination requires that each donor, and similarly each project and subproject, clearly specifies the bounds of its project works. In Kiribati, the climate change office sits within the Office of the President and not within one of the already established ministries. Despite this, project management conditions – with outputs, objectives and performance indicators – require definitive and bounded sub-components. Project management techniques, such as ToRs individuate diverse climate change impacts and are a key instrument in governing these impacts.

3.3.2 Disentangling and separating through technical practices

Similarly, the KAP's technical emphases act to disconnect the various components of climate change. The sea level rise and wave strength predictions assignment provided a vast series of numerical indications about what Kiribati could expect in the coming years. This information was summarized in Excel-document calculators which, with requisite assumptions and locational and temporal specifications, could provide a sea level rise number (0.79m in 2090 for example). Only certain people were trained to use this information: for example, climate change advisors within the Ministry for Environment, Land and Agricultural Development (MELAD), whose specific role it is to get:

> information from scientists about climate change and Kiribati and to clarify if what was said was factual… to understand how the sea level is changing and how rainfall is doing. The MELAD is also tasked with understanding the information that is generated about climate change. There is a lot of scientific information that needs to be understood. (MELAD, 28 May 2010)

Government officers in the Meteorological Service were also trained in using these data and calculators. The Meteorological Service officers are also charged with collecting climate and weather data:

> The Met Office was established for the purpose of collecting weather and climate data, within the Kiribati region. Originally we had 8 stations in Kiribati... Currently, at the moment, we have only 5 stations operational, the other stations are silent at the moment, because of a lack of equipment and so on. But the things we record are temperature, pressure, when I say temperature I mean maximum and minimum, and another important parameter is rainfall, as well as pressure. It's limited to those kinds (Meteorological Office, 25 May 2010).

Currently, however:

> We just collect all the data and send it to New Zealand, most of the analysis is done by the NZ Met and the NIWA [The National Institute of Water and Atmospheric Research Ltd, who completed the sea level rise and wave strength projection reports] ... In terms of weather information, our reports go directly to New Zealand, Fiji, NZ Met and Australia. In regards to the climate data, at the moment we try to archive here, but most of the past data is with the NIWA and some others... But the main one is the NIWA and the NZ

> Met... the concern [with sharing] is the misuse of the data. Most people, they, don't know how to use it

In other words, the Meteorological Service doesn't provide the information it collects or analysis of the information it has gathered from the KAP activities to other Ministries or interested parties; primarily for fear of misuse (Meteorological Office, 25 May 2010). The extremely technical nature of the consultancy reports means that there is little sharing of the consultancies' outputs with diverse governmental actors and integrating them with current or future planning practices, as I show in the following paragraphs.

In making best practice coastal defences, sea level rise and wave strength calculations have, in fact, been incorporated into designs for sea walls (Beca Infrastructure, 2010). The pilot 'best practice' sea walls that the KAP built as a demonstration project incorporated the predictions from NIWA for high tides and wave strength to determine how high and how strong a wall must be. In designing and implementing this new coastline approach, a KAP employee drew on his diverse experiences working: in the United Kingdom on their 'planned retreat' coastline designs; in Mexico examining the effects of large infrastructure projects on coastlines; and "big projects in the Middle East, kind of, building artificial islands, you know big money projects" (Consultant to the World Bank, 10 May 2010). This KAP employee used these "foundations" to help implement an action guideline:

> We've designed a shoreline action guideline and hopefully going to teach them about... having a proactive rather than reactive [approach]. Although at the moment they are very much behind in critical areas that need immediate work, so it's very difficult to be

> proactive when there is so much reactive work that still needs doing... But the idea is to eventually to get them proactive.

However, incorporating predictions into sea wall sites and designs only involves 'adding-on' sea level rise predictions once the sites and designs have been chosen. That is, whilst the aim of this component is to encourage those building coastal defences to consider a wider range of options – for example, softer options like beach replenishment, alongside harder options like building sand-bag or concrete sea walls – the sea level rise and wave strength impacts are only considered once these decisions have been made:

> NIWA's stuff [sea level rise and wave strength predictions] is quite academic. It's a lot about wave transformation and thinking about what the conditions and sea level is like in 100 years... What we are trying to do is come up with something practical, [an] approach that they can then use (Consultant to the World Bank, 10 May 2010).

Thus, these scientific inputs about sea levels and wave strengths are not contributing to decisions about which coastal defence to choose, but rather only determining the height of the solid coastal defence once it has been approved for construction. Furthermore, these two factors – high tides and wave strength – are considered in separate tables in individual chapters of the Shoreline Protection Guidelines (Beca International Consultants, 2010, pp. 8-11), not as integrated design contributions. Sea level rise and wave strength are considered as separate, delineable environmental effects, simply to be tacked onto engineering decisions that have already been made. Separating sea level rise from wave strength through different climate change scenario calculations allows these tasks to be managed individually through coastal defences. Differently labelled climate change outcomes are separated discursively – sea level rise and wave strength –

and they too are separated from their effects. Once this is completed, these climate change impacts can be governed.

Whilst climate change predictions may be incorporated, at least at the final stage, into KAP components, they have not contributed to other decision making for infrastructure. As the Meteorological Service officer indicated above, they do not share their projections even though they recognize that their data would be useful for government planning:

> Q: What services could you provide the government to improve their adaptive capacity?
>
> A: Predictions, yeah, something like that, climate predictions. I think that's the basic one. The predictions and maybe the history of the climate (Meteorological Office, 25 May 2010)

For example, when I met with a senior architect from the Ministry of Public Works and Utilities, he expressed dismay:

> I am an architect, how am I meant to incorporate, how should I incorporate climate change into my designs? I don't know where the projections are or what they mean. There should be a set of guidelines as part of the climate change adaptation process, it should be part of KAP to distribute this (MPWU, 26 May 2010).

According to this architect, the coastal defences component of KAP "[is] fixing coastal protection in South Tarawa by doing a study and formulating best practice standard guidelines, so that engineers in the future can use these standards." But for him to incorporate this data, it

> is just too confusing, no one understands it, it's not in the right form. Perhaps after the FS6, the foreshore protection, the engineers will be trained and they can help. We have

> 4-5 engineers, they are just young, graduates, they only have diplomas in engineering. Our lack of capacity is a major issue. From a diploma they are not in a position to design (MPWU, 26 May 2010).

And anyway, for this architect, "any climate change considerations would end up escalating the costs so it would not be economical anyway." There are both financial and technical barriers between project work and non-project work established through scientific practices. This example also demonstrates a failure of project practices to translate into locally specific and implementable practices. Climate change impacts are to be governed separately from other regular development concerns (such as buildings).

Similarly, the various governance techniques of groundwater modelling and coastal defences are separated. Again project practices disconnect these two components: the groundwater component is funded solely by AusAID, and thus has separate budgetary and accounting practices from the coastal defence projects or the climate projections project. However, the technical actions of the consultancy also operate to individuate the effects and requirements of groundwater management from those of coastal defences and climate change predictions. As mentioned previously the groundwater management sub-project attempts to understand the shape and quality of groundwater lenses throughout the Gilbert Islands. Groundwater size is considered important in order to know the volume of freshwater available, so as to determine how much can be extracted. These predictions and calculations are crucial in decisions about how, how much and to whom resources are allocated; how these resources are governed. Yet the interactions between building sea walls and groundwater size aren't considered by the KAP consultancies. Building sea walls and other infrastructure can affect the shapes of the islets and their freshwater lenses (AMSAT/CSIRO, 2007). For example, a long

causeway was built between islets in the lagoon of Tarawa atoll. This causeway altered tidal patterns and consequently the shape of one of the islets. In particular, that islet can no longer support palm trees as the freshwater lens disappeared due to its change in shape, as lenses commonly do (Bridges & McClatchey, 2009). This islet is frequently used as evidence of the effects of sea level rise in Kiribati amongst locals: whilst erosion and loss of land are important, the first and major impact of rising tides will be the loss of the fresh groundwater supply as it will be inundated with saltwater (Bridges & McClatchey, 2009; Green et al., 2007). Despite the interrelated nature of sea level rise, coastal construction and groundwater size and shape, as revealed by this example, the groundwater component of KAP operates individually, both in project practices, but also through its technical aspects (which will be discussed further in section 3.3.3).

3.3.3 Climate change adaptation using governance techniques

Once environmental changes are bounded through technical and project management practices, scientific information is required to establish 'baseline data' in order to 'know' and 'understand' these changes, both occurring and predicted. The desire to know and understand change is common amongst those consultants who are operating within the adaptation-development industry; accordingly, in order to implement climate change adaptation, very specific climate change data is required (see Barnett (2001) for a description of another approach, which respects uncertainty rather than attempting to eliminate it). For instance, an engineer coordinating a water agenda for Kiribati (not as part of the KAP), stated that in order to build infrastructure such as ports, precise sea level rise projections are required; engineers need to know if sea level rise is going to be fifty centimetres exactly, or double that.

Those working on the KAP agreed that there is a need for numerical indications about the current state of the environment. The KAP aims to produce these indicators. Groundwater analysts express dismay that there is no data about water, ready for them to "assess, monitor, analyse" (GWP, 8 May 2010), and claim that there needs to be an emphasis on collecting data regularly and consistently. Similarly, those tasked with regulating the environmental effects of new infrastructure (in this case, in relation to building sea walls), would like more data in order to measure the effects of new built structures:

> At the moment we don't have any standards. It's more, we don't have any numerical standards, we only have narrative standards... The construction of the seawall has to be responsible for any damage... Before the construction there is supposed to be baseline data... Like fish monitoring, you know. And then during the construction, but this only applies to big projects, so during the construction we have to make sure the monitoring is continued, so not only during but after the construction. (MELAD, 31 May 2010)

From the baseline data that the KAP is generating, predictions and changes are to be identified. One passionate and lively water engineer, who abandoned doctoral studies in Australia with the desire to work in Kiribati, claimed:

> A big problem here with climate change is that we don't have baseline data. Here people say, this is climate change, that is climate change; we've got no baseline data, so we cannot know. And it seems like last year we got salinisation of some of the wells, and people were saying well that's climate change because it's never happened before. Some of that is definitely because people had just got pumps on their wells and they were solar pumps so you can run them all day… So you'll hear some things attributed to climate

> change that are just not climate change, some things that may be, but because we have no baseline data, we've no idea. You'll hear some westerners that haven't been here all that long, you know maybe 10 years, saying oh yes, but these are unexperienced storms, but if you talk to old people here, they'll say it's coming back, the climate is, it's long term, 40-50 years cycles. (Consultant to the World Bank, 10 May 2010)

For this engineer, in order for climate changes to be known, understood, and governed, the changes must be established quantifiably, and shown by detailed descriptions of their physical and statistical characteristics (compared to an emphasis on managing for resilience). Numerical data allows consultants and government officials to categorise changes as either climate related or from other effects (technological development, natural variations in climate, and also changes caused by population growth and other social factors). Once this information is generated, the effects of climate change are identified numerically, and then the acknowledged climate changes can be governed through policies and practices.

In the KAP, climate governance is also performed through numerically supported policies generated by consultants through the project components. Consider the case of groundwater lens modelling. Information about the thickness and quality of the groundwater lens will be used to generate policies about where to pump water and how much can be pumped. Choosing where to pump, a consultant described in a presentation to project funders, must depend on good data, community governance structures and good maintenance. Similarly, the groundwater lens policies must be informed by data about a sustainable yield from the freshwater source, which incorporates data about population growth, water usage and sea level rise (GWP, 15 May 2010 and Public Utilities Board, 2 June 2010). In other words, these calculations are used to decide who gets water and how much; these calculations are used to govern water. 'Expert' calculations

of the sustainable yield from the groundwater lens are currently used to ration water in South Tarawa; a Public Utilities Board executive exclaims:

> Right now we give water once every other day. We give for about 2-3 hours depending on how big the area is… The goals are just to provide enough water. The Ministry of Works then monitors the water lens and the safe water levels, in the pumps as well (Public Utilities Board, 2 June 2010).

In turn, the groundwater policies must feed into a National Water Policy from which sustainable water governance will (obviously) follow. As the hopeful water engineer described:

> We've got the detailed implementation plan, now we've got 72 steps… and for the first time [we] look at it at the beginning of each year when we are supposed to set out things that we do for the year, they actually look at it, and we put a whole lot in there, and yet we are not going to achieve them all. But we've actually got something, instead of just doing it ad-hoc, randomly; we have got a plan for how things can happen (Consultant to the World Bank, 8 May 2010).

The coastal defences component of the KAP also uses technical data and policies to govern climate change. In this case, governance of climate change occurs through better construction practices but also through guidelines that specify construction rules, methodologies and assessment techniques. As the cosmopolitan coastal defences engineer explains, the best-practices coastal project is

> giving them [i-Kiribati engineers] best practice for coastal management... but we are also giving them best practice in construction. Even that's not a formal document that goes

> into their policy process, it's still a practical experience of best practice (Consultant to the World Bank, 8 June 2010).

Currently the i-Kiribati construction experts have 'bad' practices, including "not washing their concrete, not washing their sand, dipping their sandbags in salt water and all the cement washes out", the engineer continued. In contrast, the Shoreline Protection Guidelines can be used to "carry out the proper surveys and then adopt which kind of coastal protection is appropriate. It may not always be a seawall" (Government of Kiribati, 2010b). According to formal descriptions:

> The guidelines will assist decision makers and especially the Foreshore Management Committee that makes recommendations to approve development along the foreshore. They have been developed in such a way that will make decisions easier and well informed. It is crucial that we use them and train people how to use them (Government of Kiribati, 2010b).

Numerically defining the bounds of climate change and separating out the concept into its component parts – sea level rise, wave strength, changing freshwater resources and coastal protection – allows climate to be governed. The KAP draws on familiar governance techniques – policies, practices, models and restrictions – made possible by converting novel climate changes into measurable and discrete environmental changes. When undertaken in the name of climate change adaptation and grouped together, these components add up to climate governance.

Conversely, some i-Kiribati public servants rebel against this standardised attempt to govern climate. "We want infrastructure, we know what we want" claims a busy and influential, government climate spokesperson.

> That's the usual problem with projects. First donors insist that it should have [a] consultancy component, we need to [do a] study… But I guess to satisfy their own requirements, or to make sure they get most of the money; they retain most of the money. (MFA, 1 June 2010)

The KAP attempts to govern climate change, as demonstrated in the analysis above. The literature claims that climate is governed through market-based schemes which attempt to manage carbon emissions. In other words, the effects of climate change will be controlled by actually limiting climate change itself, by preventing it. However, climate change adaptation projects, such as the KAP, are also an attempt to manage climate change in that they attempt to modify the way that climate and society are affecting, and relating to, each other. Water governance techniques might try to manage the material structure of a river, through engineering works such as dams. But they also attempt to manage how humans get water, use water, pay for water and so on. In other words, governing the non-human world – water, climate change, etc – is not simply a matter of altering the non-human world alone (as if this were ever possible), but is an attempt to alter the relationships between humans and the non-human world and the way the one affects the other (through changing water infrastructure and policies and through coastal defences, for instance).[5] This is the case with the KAP, and is why I make the claim that climate change adaptation projects are an integral component of climate governance regimes. In sum, climate governance does not solely consist of attempts to alter the rate of change of climate (through management programs that alter greenhouse gas emissions) but also to change the relations between humans and their climate.

[5] I am not attempting to address or analyse the nature of non-human and human interactions and how they might be (re)produced through climate change adaptation projects such as the KAP. I do, however, recognize that this relationship is complex and extensively analysed elsewhere, see for example Castree and Braun 2001.

Extensive numerical measurements are required to facilitate these governance practices: this is why the KAP has focused on such computational outputs, as documented in section 3.3. Like attempts to govern other environmental changes, governing climate through adaptation projects has important and previously unexamined affects. Configuring climate change (a socionatural entity) as something to be governed requires disentangling and separating climate impacts, as outlined above. The knowledge claims made in doing this are not neutral, like all governance techniques. In the following section I examine some of the effects of these governance practices.

3.4 Adaptation is more than the sum of its disentangled parts

While the KAP may attempt to individuate its component parts in order that these parts become governable, climate change adaptation is more than simply the sum of these parts. I suggested above that project practices and the extreme technical focus of the KAP act to bound and separate different aspects of climate change and provide extensive 'baseline data'. Once the numerical representations of climate change are understood, then the effects can be governed. However, for the KAP and climate change adaptation in general, the collective idea has both material and discursive forces greater than the individual aspects that the KAP has demarcated: climate change overflows from these rigid governance practices.

In the simplest sense, climate changes interact and cannot be easily separated. Each of the components outlined in this chapter that the KAP attempts to address individually (i.e. sea level rise, wave strength, coastal defenses, and groundwater assessments) interact in complicated ways. Sea level rise and wave strength themselves comingle, requiring joint probability distributions to predict their effects. And even joint probability distributions can never capture the interactions between wave strength and sea level rise. For instance, during El Nino Southern

Oscillation (ENSO) events, prevailing wind directions in Kiribati change from easterly to westerly (AMSAT/CSIRO, 2007). This change in wind can cause a rise in sea levels of up to fifty centimetres, regardless of climate change induced sea level rise. The combinations of waves and altered wind direction also affect wave strength and positioning. In turn, these variable conditions significantly impact coastal erosion and beach morphology. To complicate things even further, the relationships between ENSO events and climate change are unknown and unpredictable. Unsurprisingly, sea level rise and wave strength also influence the need for, and design of, coastal defences in non-linear, complex and un-predictable ways.

Similarly, vast feats of engineering, such as large scale coastal defences, affect access to freshwater. Concrete, a common material in such engineering schemes, uses large volumes of water. Construction (concrete in particular) has substantial amounts of embodied greenhouse gases, which feed back to reinforce climate changes and influence sea level rise. When not imported (a process with associated greenhouse gas emissions), sourcing materials to build coastal defences can encourage or alter coastal processes such as erosion through reef blasting or mining (AMSAT/CSIRO, 2007). Coastal defences also alter the ecological equilibrium of already mobile atolls, which can change the shape of islets, and thus their freshwater resources. There are many more examples of linkages between the components that the KAP attempts to separate in order to govern. To bound parts of climate change and adaptation is to assist governance; but climate change rebounds from these precise characterisations. The individual components interact in confounding ways. This is not to suggest that there is necessarily a superior approach to governing climate change impacts, but rather, that these complex interactions cannot be eliminated, and climate change will continue to cause surprising events.

Second, climate change adaptation is a transformative idea. As the KAP attempts to embody climate change adaptation, it is transformed from a standard donor funded project into a novel site of experimentation. For instance, the British engineering company that analysed and modelled the groundwater resources for the KAP has previously conducted similar analyses elsewhere, including "freshwater lens investigations in Niue", "national drought planning in Tuvalu" and "tsunami water resources impact assessment in the Republic of the Maldives" (GWP Consultants, 2010a). Their investigations in Niue, aimed to

> determine the geometry of the freshwater lens on the island and improve… [the] national water resources planning in terms of the island's sustainable water yield, its vulnerability to drought and risk of pollution from land based activities (GWP Consultants, 2010b).

This description echoes the groundwater assessment component of the KAP. Yet, nowhere in the company's descriptions of its Niue project (or numerous other similar ones) does it mention how these assessments will aid adaptation to climate change. The KAP groundwater lens assessments have been transformed from standard water governance to climate change adaptation, simply by reference to climate change through its position within the KAP, and numerical reinforcement of the effects of climate change on vulnerable Kiribati. The idea of adaptation in this particular component allows the work being done to change from standard practices into novel experimentation.

Climate change adaptation also frames the KAP. The KAP financiers needed an adaptation project, and so they financed the KAP. The World Bank needs the KAP to represent its experimentations and experience in climate change adaptation in order to lend legitimacy to the Bank's desire to implement adaptation projects elsewhere. The World Bank sees climate

change adaptation as central to its mission: climate change and variability will profoundly and adversely affect development and poverty, as emphasised in the 2010 World Development Report (The World Bank, 2010b). As a consequence, adaptation is a core aspect of its agenda, as evidenced by the recent lobbying for (and consequential awarding of) the role of trustee of the one hundred billion dollar (annually) UNFCCC climate change adaptation fund (UNFCCC, 2010). Interestingly, when presenting its capabilities to the Adaptation Fund Board, the World Bank emphasised its experience in adaptation, having implemented and gained experience from the KAP. In short, the KAP is central to the World Bank's transition into implementing adaptation projects, as it represents key expertise and experience.

Similarly, a manager of the KAP, who was an early champion of the need for climate change adaptation in the Pacific Islands, suggested that subsequent climate change adaptation projects have drawn from the successes of, and lessons from, the KAP. One lesson implemented in Zambia and Mozambique has been to "basically put investments into moving trains... [to] help the country achieve its transformational agenda" (World Bank, 6 April 2010). The KAP "was a pioneer", and many other adaptation and resilience projects implemented by the World Bank "[build] upon this model and now incorporate many of the elements to embed climate change resilience in national economic planning" (World Bank, 6 April 2010). As this manager has since taken up other opportunities around the world, the KAP and its ideas travel too. The KAP's status as a novel adaptation project means that it is of greater than usual importance for the World Bank (i.e. it is more than the sum of its parts) as it attracts future investments (e.g. the Adaptation Fund) and provides legitimate expertise in adaptation. Another early project manager (and current IPCC author, working amongst the climate change adaptation and development nexus) forthrightly remarked, when describing why the KAP was an important project to fund:

> Working through the amounts of adaptation money that everyone now sees is a development opportunity for the Bank, this is going to make a difference for the Bank's mission to alleviate poverty. We really felt that this was something that the Bank needed to get its act together on, and Kiribati presented a good opportunity because it wasn't very political, we could experiment for three years with a good preparation grant from the Japanese government which allowed us to do it diligently (Formerly World Bank, 12 April 2010).

The Global Environment Facility (GEF) also required that the KAP address climate change in order to meet the GEF's 'additionality' funding specifications. The KAP received a Strategic Priority for Adaptation (SPA) grant from the GEF which funded the recently completed second phase of KAP. However funding from the SPA grant is restricted to activities with global environmental benefits. There:

> was clearly a tension within the funding we had at the time, so we had struggled to find grant funding in a way that was appropriate to what we wanted to do. Particularly for the SPA GEF funding which was restricted, in the end, to those things with global environmental benefits. You had to prove you were doing adaptation and things on biodiversity, of international waters or other international environmental issues... The real reason behind this project is not the co-alignment of adaptation and other global environmental benefits... So, we had some packaging to do (Formerly World Bank, 12 April 2010).

As a consequence of these restrictions, the GEF only paid for a proportion of the KAP (27%); the proportion which it deemed to be 'additional', or on top of developmental objectives, and caused by climate change (GEF, 2005).

The KAP, therefore, had to be 'packaged' as climate change adaptation to satisfy both the implementers and the funders of the project. To convince funders before the project commenced, the KAP drew on a previous World Bank report (2000), *Cities, Seas and Storms*. This report quantified the anticipated effects of climate change on the economies of Kiribati and Fiji. Once the KAP had its own calculatory output, it could also re-frame itself as climate change adaptation. This further explains the KAP's focus on measurement and modelling. Calculating climate change – sea level rise, wave strength, coastal defence options and so on – provides legitimacy to the project, that it is actually attending to the impacts of climate change. During the planning stages, project documents drew on Kiribati's vulnerability to prove that the project addressed climate change. During the project, technically obscure components allowed the KAP to emphasise that it pertains to climate change.

This packaging resonates with Mosse's (2005) analysis of success and failure in development projects. To reiterate, Mosse contends that development project practices are similar – in the case of the KAP, like many development projects before it, there is a continuous supply of technical outputs in consultant's reports. Yet success and failure depend on articulating these technical practices through chains of translation, with the latest policy paradigm. As climate change adaptation is emerging as the latest paradigm from the World Bank, the KAP's success and failure depends on providing the evidence that it is fulfilling this goal. Simultaneously, the KAP embodies World Bank experimentation in policy development. As Goldman has analysed with social and environmental justice agendas in the past, the KAP has

become the latest policy archetype to be incorporated into the World Bank's competencies, a policy that can subsume some development concerns, if they are 'greened' or 'climate-proofed', but which has unique funding opportunities. The World Bank will continue to use the KAP to generate information about climate change; the KAP *is* climate change adaptation in this institution. And like the different agendas before it, the World Bank becomes the expert in this new policy field. The KAP becomes the project that others turn to when implementing new projects, and this is the project that the World Bank draws on to demonstrate its expertise.

The KAP presents ample evidence to suggest that standard project practices have invaded it. Climate change adaptation is sufficiently numerically articulated in the KAP so as to be able to satisfy project management demands, as Goldman suggests is necessary. The KAP collects all the knowledge the Bank desires (Roy, 2010) – number of people, number of dollars, number of centimetres of sea level rise and so on, some of the effects of which I have outlined above. In fact, the KAP draws on previous development project expertise, including community driven development and community based resource management. However, ironically, both were abandoned to focus on more technical, information generating components (World Bank, 6 April 2010). Numerous consultants confessed that "it is development packaged as climate change adaptation; this work needs doing anyways, but it is all wrapped under climate change adaptation" (GWP, 8 May 2010).

The KAP is more than simply the same development project practices articulated differently to satisfy the climate change adaptation policy agenda (although it does, of course, satisfy project management imperatives). First, the KAP operates within a wider network of adaptation projects from which other projects draw. Second, the World Bank has become a major player in adaptation project implementation and expertise, at least in part as a result of their

involvement in the KAP. And the KAP has also remade both the policy and donor landscape of Kiribati (which I will discuss further in the following chapter).

3.5 Conclusions

I have demonstrated above the extent of the calculatory and policy oriented practices of the KAP. The aims and effects of these practices are several. According to project documents (GEF, 2005), these practices were intended to: develop adaptation measures and integrate climate concerns into economic planning, and increase capacity to resolve climate issues. From the analysis above, however, it seems the technical focus of the KAP allows these practices to establish governance regimes for climate change. Separating the diverse components of climate change enables data-driven policies to manage the relations between social relations and climate change impacts, for instance, by mediating the ways in which decisions about resources are allocated – including water, or coastal protection. Simultaneously, these calculations are empirical evidence that the KAP is a novel experiment in climate change adaptation. The KAP and its models are an integral component in establishing World Bank expertise in implementing adaptation projects.

Based on evidence from project documents and interviews, the KAP does not appear to have increased capacity amongst i-Kiribati public servants, given that World Bank managers and international consultants completed the extremely technical components (and the i-Kiribati public servants did not complete them). At the very least, capacity building takes longer than the lifetime of a project. As I hinted at throughout this chapter, consultants frequently lamented the 'lack of capacity' amongst local bureaucrats. These consultants never paused to reflect on the educational achievements of many they met; most bureaucrats I spoke with had received university degrees, and often postgraduate degrees at universities in Australian and New Zealand. Of course, capacity is constrained by a lack of financial freedom – in short the GoK

does not have very much money for financing change, or capital expenditure. However, the i-Kiribati public servants and their apparent lack of capacity is not merely rolled-over by consultants and their technical reports, instead these public servants are enrolled in this climate change governance regime.

There are several overflow effects from these technical practices. First, climate change resists these simplifying categorisations. Primarily, sea level rise and wave strength, ground water models and coastal protection cannot be understood as separate, yet cumulative, components of a complex ecological system. Rather, these elements confound; interacting in unpredictable ways and producing unknowable material effects. Second, the assemblage of diverse empirical outputs discursively orients the KAP, remaking this project as one of climate change adaptation. That is not to say that the KAP is simply fiddling with measurements and calculations while the sea level rises. Rather, the KAP is establishing the numerical bounds of climate change in Kiribati, with the intention that this information alters government planning processes to incorporate climate risks. Again, there is no evidence to suggest that simply providing climate change projections alters long established processes, especially when these projections are little understood. These calculations, do, however, have effects (as mentioned), just not the predicted or desired effects. Simply modelling predicted processes does not mean the processes will conform to these predictions.

Climate change adaptation is an aspiration, for the people of Kiribati, but also for the implementing and funding institutions such as the World Bank. This aspiration is somewhat desperate, impelled by urgent anticipated climate changes. The tight timelines are not only specified by World Bank management conventions, but also by the pressing need for adaptive techniques to cope with climate change, especially in places such as Kiribati. Yet, there appears

an operational void: we are compelled to act, yet don't know what to do. This void is filled by projects and the developmentalist apparatus, including institutions, techniques and personnel. People get busy, making projects, fulfilling phases, and funds get circulated in this project space. In the case of the Kiribati Adaptation Project, these funds barely leave a trace of institutional change or of physical infrastructure. Instead, however, there is an endless paper trail of technical consultant reports (some of which I have described).

In addition to the project 'stuff' that fills the void, there are the vast calculatory apparatuses. These measurements and models are required in order to know how to adapt to climate change, or to govern these changes. The endless calculations are both the result of not knowing what else to do, and also the need to understand climate and its corollary environmental impacts through measurement in order for these changes to be governed. These calculations certainly help us understand the complexities and challenges of climate change in fragile atoll ecosystems in particular. However, whilst these calculatory practices continue, reinforced by project management imperatives, the funds designated for climate change adaptation circulate in project spaces inhabited solely by Northern consultants. The implementers of, and consultants to, the KAP have acquired experience and expertise from their project practices; they have at least as much to gain (and indeed, much more financially) from adaptation projects as the i-Kiribati people themselves.

4. **Performing/performative vulnerabilities**

Definitions offered by vulnerability studies suggest that it is a state that can be measured and known. Vulnerability is defined as a function of a person's or a place's state of exposure, sensitivity and adaptive capacity (Adger, 2006). As such, vulnerability is a condition that a people or place have or do not have. A person's or a place's vulnerability is, accordingly, calculated using their various characteristics and plugging them into formulas like these:

$$Vulnerability = Function\left(\frac{Exposure \times Sensitivity}{Adaptive\ Capacity}\right)$$

However, when conducting studies in the archetypical vulnerable place – Kiribati – it becomes apparent that vulnerability is not merely a condition. Instead, I show that vulnerability is an assemblage of performances and material conditions, which is performative. I draw from studies of performing identity and performing financial markets to suggest that being vulnerable is performed by various actors. I argue that these performances are assembled into *agencement* (Braun, 2008; Caliskan & Callon, 2009, 2010; Callon & Law, 1995; Hardie & MacKenzie, 2006); collections of actors and material things with the capacity to act in their coming together-ness. *Agencement* remake vulnerability in Kiribati. Performances are performative, because they are productive, producing new identities and new vulnerabilities. But these performances only make sense in that they reference, or cite the material conditions of life in Kiribati; they only bring vulnerability into being along with other matters of fact, including statistics about sea level rise, graphs, or photos of flooded houses. One is not simply free to perform away vulnerability, or perform non-vulnerability, or un-vulnerability; these performances are structured and conditioned. Rather, vulnerability to climate change emerges as a result of these assemblages;

and the relationships between characteristics of places and vulnerability are enacted with performances.

My argument proceeds as follows. In section 4.1 I outline how vulnerability has been defined and understood to date in 'vulnerability studies' literature. There have been recent attempts within geography to understand vulnerability using feminist frameworks such as embodiment and corporeality; however, these have not yet embraced the frameworks of performativity. In section 4.2, I detail what the literature about performativity and performance might lend to understanding vulnerability. Following this I explore several examples of how vulnerability is performed and what the effects of these performances are. I conclude in section 4.4 by suggesting that understanding vulnerability as an assemblage of performances, actors and things has radical potential. In particular, vulnerability can be assembled in ways that recognise strength rather than weakness, and in so doing to see i-Kiribati people as active subjects, rather than passive victims.

4.1 Defining vulnerability

According to Adger's (2006) much cited article, a people's or a place's vulnerability is their susceptibility to be harmed. More specifically, vulnerability – to an extreme event, for example (but also gradual changes) – is said to be a function of exposure to the event, sensitivity to the event, and adaptive capacity to the event. This definition attempts to succinctly incorporate the various social and ecological components of surviving under stressful conditions. Adger (2006) also notes that the term has associated questions that are challenging to answer. For instance: how is one to measure vulnerability; or how does one differentiate between objective and perceived vulnerabilities? These questions have received much attention within geography.

Despite the brevity of Adger's definition, others have long debated how to measure and categorise vulnerability. Fussel (2007) has distinguished between end-point vulnerability and starting-point vulnerability. End-point vulnerability is the expected total impacts of climate change, taking into account any adaptations that; end-point vulnerability is what is left over after adaptations and climate changes have occurred. In contrast, starting-point vulnerability is a permanent state of social and ecological systems; it is the potential to be harmed by any future climate hazard. However, O'Brien et al. (2007) insist that end-point and starting-point vulnerability are better classified as outcome and contextual vulnerability. According to this classification, outcome vulnerability represents the expected impacts from projected climate changes, i.e. several units of vulnerability from some units of exposure. Conversely, contextual vulnerability describes the underlying social, political, institutional and economic structures and dynamics, as they interact with the units of exposure and response. The actions taking to reduce vulnerability depend on which definition one adopts. For example, reducing contextual vulnerability suggests altering the underlying conditions through which individuals and groups experience climate change so that they may respond better. Whereas reducing outcome vulnerability would entail limiting the units of exposure, for instance, moving away from a known natural disaster zone.

These definitions and characterisations draw from previous explorations of vulnerability to environmental hazards or other shocks. For instance, in their studies of vulnerability to hunger and famine, Watts and Bohle (1993) suggested that vulnerability has three basic elements, the risks of: exposure, inadequate capacities to cope, and consequences from the exposure. When investigating vulnerability to climate change, then, authors (such as Adger (2006)) have drawn on these long-standing frameworks which incorporate the underlying vectors of vulnerability as

well as the external stressors. This emphasis on the social construction of vulnerability – the idea that something is only made vulnerable by the underlying conditions – is also prevalent in studies of hazards and disaster risk reduction (Cannon & Muller-Mahn, 2010; see also Wisner, Blaikie, Cannon, & Davis, 2003). The idea that vulnerability is socially constructed was an important shift away from previous theorisations of vulnerability as almost exclusively caused by exposure to a hazard (Wisner et al., 2003).

Vulnerability assessments[6] incorporate this insight to identify 'hot-spots' of vulnerability. These assessments are used as targeting tools by policymakers so that they can identify who is vulnerable, in what ways, and how this should be ameliorated (Buys, Deichmann, That, & Wheeler, 2009; Fussel & Klein, 2006; Heltberg, Siegel, & Jorgensen, 2009). As Cutter (2003, p. 6) argues:

> vulnerability science helps us understand those circumstances that put people and places at risk and those conditions that reduce the ability of people and places to respond to environmental threats. Vulnerability science provides a basis for risk, hazard and disaster reduction policies.

It is geography's job, Cutter suggests, to provide, understand and analyse the information about vulnerability, always striving for more accuracy in prediction, planning and preparedness.

Compared to climate impact assessments, vulnerability assessments are more comprehensive as they include information about climate change, but also the non-climate

[6] Vulnerability is not a concept unique to studies of human susceptibility to change. The framing of a vulnerability assessment, as a mode of assessing capacities to cope with phenomenon such as climate change, are also common in other sciences, such as the ecological sciences (see Head (2010) for an analysis of concepts moving between the two). Vulnerability assessments, then, are a widespread tool for understanding the responses of any complex system (ecological, or human) to external forces of change.

stressors and the underlying socio-economic factors (Fussel & Klein, 2006), This reflects the understanding that vulnerability is not just a function of exposure, but also of the capacity of people or places to cope with the changes as determined by a matrix of underlying characteristics – social, economic, political and other. There is no agreed method for calculating the vulnerability of a socio-economic system (Fussel & Klein, 2006), but many vulnerability assessments still attempt to provide a quantitative measure. The 'Second Generation' assessments – that succeeded First Generation assessments as they also consider non-climatic stress factors and adaptation potentials – estimate the vulnerability of regions or sectors to climate change. In her Second Generation-style study, for example, Tschakert (2007) argues in that information about adaptive options which are locally situated is required to understand the vulnerability of farmers in sub-Saharan Africa. In particular, Tschakert implores vulnerability studies to incorporate the 'views from the vulnerable': doing so in her study found that in rural Senegal, the social vulnerabilities of sickness, few income opportunities and dilapidated infrastructure are greater stressors than climate extremes.

Despite the aforementioned progress in defining vulnerability, some critical geographers have found the need to introduce more embodied understandings of vulnerability. Using the example of the 2004 Indian Ocean tsunami, Findlay (2005) suggests that social theory can provide an axis for analysing vulnerability. Findlay demonstrates this by exploring how theoretical insights about the relationality of knowledge can contribute to understandings of vulnerability. For example, vulnerability was perceived differently across spatial and temporal scales, reflecting the situatedness and relationality of knowledge produced about the effects of the wave. Thus, vulnerability was constituted, interpreted and understood differently: as a characteristic of Indonesia versus Sri Lanka or Thailand; as time progressed and more data was

collected and analysed; and depending on who was producing this information, and for whom and from where.

Others have also followed this social-theoretical strategy. For example, instead of understanding vulnerability as an incidental or empirical condition that is to be alleviated (as in vulnerability assessments), Harrison suggests we grapple with vulnerability as an eternal trait of bodies generally:

> the corporeal existent [is] always already open or exposed in some way beyond its will and intentions, vulnerability describes a thoroughly social body... a sociality of proximity, a sociality primarily described by a nonintentional and differential rapport or relation with alterity that is the event of exposure and susceptibility (Harrison, 2008, p. 425).

In other words, even if one recognises the uneven social and geopolitical distribution of the effects of disasters, there remains

> a vulnerability which... may be reduced or deferred, but is never overcome: a susceptibility that is not simply a failing, a structural fault, or a surmountable hurdle, but is a part of our all-too-humanness (Clark, 2007, p. 1132).

In contrast, Philo (2005) insists that an embodied vulnerability would emphasise the wounds and scars, highlighting those who do the hurting and those who are being hurt. While Harrison (2008) argues that we are all always vulnerable, Philo (2005) maintains that vulnerability is caused by certain actions and actors in certain places.

Clark recognises the potential for thinking about embodied vulnerability, but he also insists that we need to recognise the "role played by extreme geophysical events" (2007, p.

1129). The vulnerability assessments mentioned above attempt to understand the complicated and interrelated social and physical causality of disasters and environmental changes. Although these studies recognise the complexities of this interrelationship, they still posit that the causation of disaster can be understood and that studies should work towards greater understanding (Clark, 2007; see for example Cutter, 2003). Instead, Clark argues that a generous geography of vulnerability should recognise a shared un-knowability of disasters, leaving agency for extreme events. A generous geography recognises the forces "which act on and through living beings" (Clark, 2007, p. 1129) – in particular how the earth, its materiality (and not just sociality) and its extreme events thoroughly affect human life – rather than simply understanding vulnerability as contingent only on underlying poverty.

Like Clark, Yamane (2009) also looks to the roles and performances of non-human agents in making regions and social groups vulnerable. Yamane demonstrates that vulnerability is determined by a collection of 'facts' which come together to characterise areas as hazardous landscapes. Hambantota, a region of Sri Lanka, has certain material conditions, such as: it is in the driest regions on a map, an unusual drought, and certain methods of rain-fed farming. These 'facts' are actors that articulate certain regions as vulnerable to climate change, mobilising discourses and materialities (policy makers, financial assistance and so on). This collection of discourses and materialities framed Hambantota as vulnerable to climate change, which led to particular policy solutions – a focus on modernising agricultural techniques. As a result of this framing, Hambantota region received ample financial assistance for this policy solution, and other regions in Sri Lanka did not, as their vulnerability was not assembled by this collection of facts and policy actors. But also

> the climate change vulnerability discourse in Sri Lanka tends to reproduce certain popular assumptions about the vulnerability of Hambantota using these artifacts and events. Within these assumptions the coping and adaptive capacities of vulnerable places and people tend to be overlooked and they are often seen as simply victims that requires assistance (Yamane, 2009, p. 2401).

Yamane's analysis shows that vulnerability is the outcome of various factors interacting, including ones that can never be overcome.

I want to pursue Findlay's (2005) social theory 'axis' for understanding vulnerability. Most of the attempts to understand vulnerability using social theory have done so in the context of extreme events, notably the 2004 Indian Ocean tsunami. Instead, I will explore vulnerability to climate change using the lens of *agencement*, performance and performativity. I argue that vulnerability is an assemblage of facts, consultants, and objects that are mobilised through project performances, constructing Kiribati as the archetypical vulnerable place. While Harrison (2008) and Clark (2007) add nuance to understandings of vulnerability by discussing how we are all always vulnerable by our very humanity, my empirical research suggests that certain people and places have to constantly articulate their vulnerability, outwardly embodied in performances. In the following section I explore these theories, drawing throughout from theorisations of performed markets and performed identities.

4.2 Theorising performance and performativity

Theories of performance and performativity originated in attempts to understand how categories and structures are enacted in everyday actions and processes (Abram & Lien, 2011). A performance is "what individual subjects do, say, 'act out'" (Gregson & Rose, 2000, p. 441); it is

a process, an activity or a practice (Szerszynzki, Heim, & Waterton, 2003). Performance is a plural analytical tool (Crouch, 2003): different theorisations of performance place emphasis on varying aspects of these actions and processes. Some recognise that performance matters in its repetition, but others consider variation and difference, the fleeting and uncertain to be the important component (Szerszynzki et al., 2003).

Analyses of performance disagree as to whether these performances are simply linguistic or theatrical. MacDowell and Court's (1994) analysis focuses on the theatrical components of performances. They examine the daily practices of merchant bankers in their workplaces and find workers are expected to act according to a certain script which dictates their speech and dress. These merchant bank performances are for spectators. Performances, in this case, are the actions of conscious and intentional actors. Gregson and Rose (2000) suggest that a theatrical definition erroneously presumes an *a priori* performing self. Instead they favour the linguistic definition of performance in which social identities are only produced through performances, and do not exist before hand (Gregson & Rose, 2000; Nash, 2000).

Amongst these differences, a focus on performance and performativity is to shift from 'being' to 'doing' in the world (Abram & Lien, 2011). For example, Horton (2003) explores how environmentalists perform their activism through the everyday practices in their lives. These performances include eating at the local vegetarian cafe, shopping at the wholefood workers co-operative market and buying local and organic foods. Performing environmental activism also hinges on the politics of transportation options; activists tend to use bicycles, walk or catch the train to get around. Owning a car is an obvious and easy target for creating distinctions between green cultural lives and consumerist, non-activist lifestyles. A green identity, however, is not an

essence; instead it emerges through the assemblage of performances and materialities (green food and consumer choices) and it changes over time.

Performances must be understood in relation to performativity. Here, I take performativity as twofold; it is both disciplining and productive (Nash, 2000). First, performativity relates to the way through which performances make sense. As Nash (2000, p. 662) explains, "performativity is not just a singular act but a reiteration of a norm or set of norms that have assumed this status through their repetition, and that become known in myriad ways." Repetitions, or citational practices, discipline subjects and their performances, through which performances are learnt and naturalised (Simmons, 2003). Consequently, there is no core to identities, or social categories. This 'anti-foundationalism' means that there is the chance to perform social relations differently– even if all performers do not possess equal powers to (re)define the interpretive frames of performances (Simmons, 2003).. In the case of environmental activists, the routines repeatedly performed by a collective of activists gives rise to the appearance of a green cultural identity (Horton, 2003). The performance of environmentalism only makes sense through the lens of this emergent identity, created through citational practices.

Second, performances are performative in that they are productive. For example, this meaning of performativity has been used to understand how markets are produced through performance recently by some researchers within economic geography (Berndt & Boeckler, 2009). According to Michel Callon (1998) and others (MacKenzie, 2006; MacKenzie, Muniesa, & Siu, 2007), a market requires disentangling and framing. As Berndt and Boeckler rephrase:

> the functioning of markets necessarily depends on a highly selective and exclusionary ordering process, to frame means to select, to sever links and to finally make trajectories irreversible (2009, p. 543).

Callon (1998) emphasises that the market and economy are embedded within economics and the knowledges, practices, and models performed by economists. Economists undertake framing and disentangling, and through these socio-technical practises perform markets (Berndt & Boeckler, 2009). To say that economics is performative means that economics does not simply describe an external, independent and unaffected reality, but rather that these descriptions *do something*; the economists models directly intervene in the practicing of markets, with diverse effects – sometimes markets conform, sometimes rebel (MacKenzie, 2007). For example, the theory of options pricing and its models interfere in the market for options, making the market legitimate and disentangling it from moral disapprovals which cast this market as simply gambling (MacKenzie, 2007). In particular, the Black-Scholes model, which created a risk-free, perfectly hedged replicating portfolio, replaced the 'rules of thumb' through which options were previously traded. But to say economics is performing markets does not imply that the act of naming alone is bringing into being: performativity is also about materialities (Berndt & Boeckler, 2009; MacKenzie, 2007). In addition, performances entail political contestation (Mitchell, 2002, 2007, 2009).

In order to perform, an assemblage of materialities is required. Callon and Law (1995) question whether an actor, for instance a managing director, can act – perform – if all of their tools (telephone, computer, trains etc.) for being a director are removed? They suggest that this director is an actor

> because he is a particular kind of emergent effect, an arrangement of bits and pieces... it also has to do with a whole lot of things that lie beyond his skin... That to be an agent like a managing director is a form of action which derives from an arrangement. That *by themselves*, things don't act (Callon & Law, 1995, pp. 485-6).

The managing director is a collectif, or assemblage, of heterogeneous parts that can perform when these parts are brought into relation with one another. As Braun (2008, p. 670) rephrases "within the terms of what is best described as a 'practical' or 'performative' ontology, assemblages have no pregiven form, but emerge as the result of what people and things do." A focus on materiality, derived through investigating emergent practices (Braun, 2008), shows that performances (and actors) are both limited and enabled by their hybrid collectives of humans, technical devices and so on (Hardie & MacKenzie, 2006).

The material limits and enablers of vulnerability can be incorporated with performativity in a theory of *agencement* (Caliskan & Callon, 2009, 2010). A theory of *agencement* is twofold. Firstly, an *agencement* comprises an assemblage of diverse forces, things and social orders (Braun, 2008; Callon & Law, 1995). Secondly, *agencement* denotes the capacity to act – perform – amongst this coming together of things, and not just humans (Bingham, 2008; Braun, 2008; Hinchliffe, Kearnes, Degen, & Whatmore, 2005). "Agencements denote sociotechnical arrangements when they are considered from the point [of] view of their capacity to act and to give meaning to action" (Callon and Caliskan (2005) in Hardie and MacKenzie (2006, p. 3)). Thus, Hardie and MacKenzie's (2006) ethnography of economic actors in a hedge-fund describes the very material components of the arrangement: the layout of the office, the numerous computer screens, the computer programs that are used. Hardie and MacKenzie show that the hedge-fund's ability to enact trades requires people (traders securities researchers,

assistants, etc) and technical systems which filter information and allow the trader to filter information, such as yield calculators. Actions, or performances (such as trading or being a managing director), can only be acted out amongst hybrid collectives – socio-technical *agencements* (Caliskan & Callon, 2009, 2010).

In the following section I show that vulnerability needs to be understand in the context of an agencement; a collection of material elements that enable performances and enact vulnerability. I argue that diverse i-Kiribati actors perform their vulnerability, as conscious and intentional agents. In many ways these performances are compelled; many actors have little choice by to perform vulnerability to attract funds. These performances follow particular scripts for diverse audiences; but this is not to suggest that they are somehow false (Szerszynzki et al., 2003). These performances only make sense in the context of repeated tropes and statistics of vulnerability in low-lying islands. Alongside performances are the enabling material elements, such as statistics, reports, images and videos; together these form vulnerability as a hybrid assemblage.

4.3 Assembling vulnerability

In this section I demonstrate three things in relation the performances and performativities of vulnerability. First, I show that vulnerability is a performance for key international audiences, such as bilateral donors and international financiers. This performance has actors and managers directing the proceedings. Secondly, I suggest that vulnerability can be understood as an assemblage of performances and material conditions. In doing this, I explore the material limits to and citational practices (or context) of the performances of vulnerability. The performances rely on calling into action certain 'facts' about Kiribati's vulnerability, including statistics, images and personal stories. Finally, I argue that these performances are performative:

performing vulnerability makes i-Kiribati people and the country of Kiribati vulnerable in ways they were not previously. This is not to say that before the KAP the i-Kiribati people were not vulnerable to climate change, or that those people who do not know about climate change are not vulnerable to its effects. Rather, I show that these performances contribute to a *qualitative* change in vulnerability as the nature of i-Kiribati vulnerability shifts.

4.3.1 Vulnerable performances

According to i-Kiribati government officers and World Bank consultants, the Government of Kiribati and KAP organised side event "Our Road to Copenhagen" at the Copenhagen COP in December 2009 was a great success. The side event was run to present Kiribati and the KAP to the world. In particular, the event broadcast the three key messages of the GoK climate agenda:

> We are here, we have been here for a while; we might not be here in the future because of what we are experiencing with climate change; we are the victims, the ones who get trampled by that race [for global development]... We need help, there is nothing we can do about this, we didn't cause this problem, but we are paying the price. So we would appreciate any help to allow our people to deal with the changes that are happening (MFA, 1 June 2010).

The event showcased the extreme vulnerability, almost helplessness, of Kiribati through scientific reports from the technical consultants to the KAP. Western scientific consultants gave testimony of the likely effects of climate change in Kiribati through presentations. Through the language of risk assessment, one technical assistant to the KAP demonstrated the various levels of danger of sea level rise in different parts of Tarawa. Using a variety of projections that this consultant investigated in his consultancy for the KAP, the presentation 'visualised' vulnerability

to sea level rise through maps of Kiribati. Different regions were coloured in red, yellow or green depicting their expected inundation, overlayed with housing and infrastructure expected to be effected. These images demonstrated the regions' vulnerability under various scenarios (see Figure 8 and Figure 9, for example). A key outcome of this presentation and consultancy was demonstrating the "extreme sensitivity to sea-level rise" (Kay, 2009).

Figure 8 'Base layer with infrastructure' slides from Copenhagen 2009 presentation (Kay, 2009)

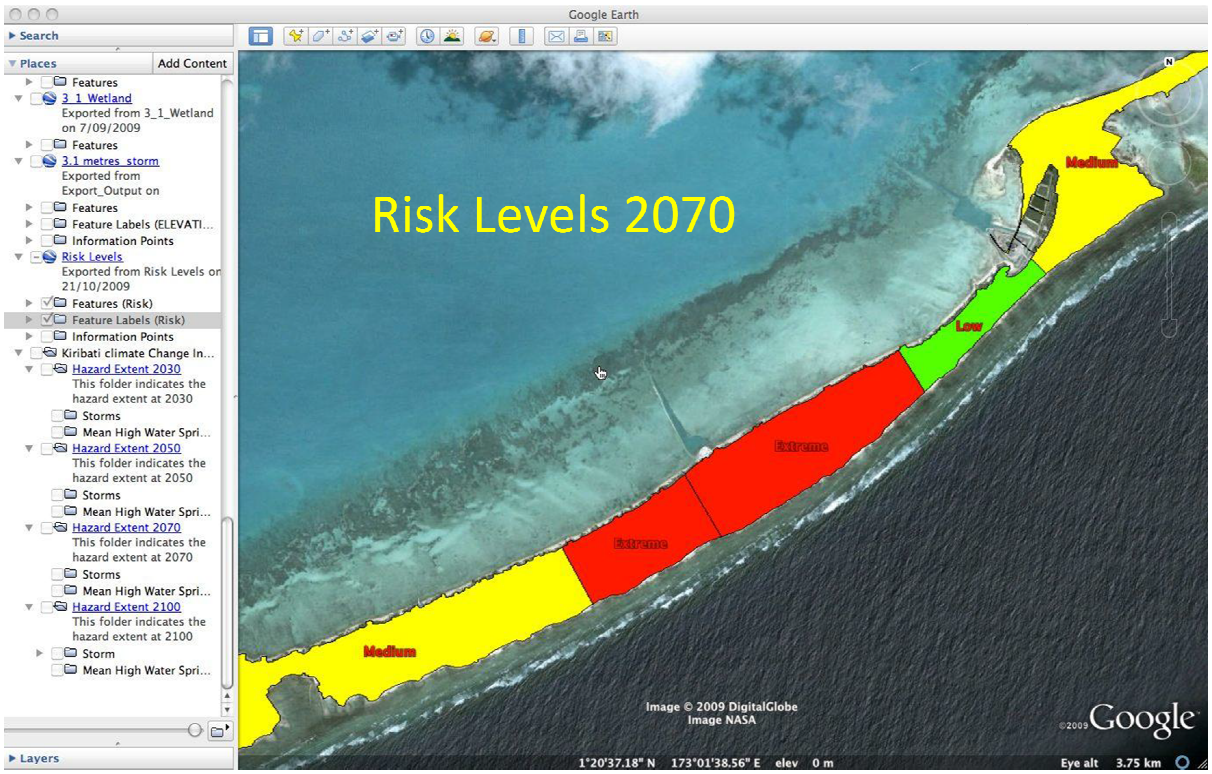

Figure 9 'Risk levels at 2070' slides from Copenhagen 2009 presentation (Kay, 2009)

A video recording of the Song of the Frigate, a traditional song about a bird unable to find its atoll-island home in the wide Pacific Ocean, showcased the 'song and dance' of the people of Kiribati, the culture at stake because of the effects of climate change. In this video, i-Kiribati women danced traditionally, interspersed with images of waves crashing against the sea walls and causeways that protect and link the islets (see Figure 10). There were accompanying images of flooded houses (Figure 11Figure 11) and coconut trees that had lost their fronds due to salt-water inundation.

Figure 10 Image from Song of the frigate, Copenhagen 2009 presentation (NTNK Video & Government of Kiribati, 2009)

Figure 11 Image from Song of the frigate, Copenhagen 2009 presentation (NTNK Video & Government of Kiribati, 2009)

The success of the side-event is a source of fierce pride amongst government and project personnel in Kiribati and it was recognised as "a heartbreaking presentation" (Government of Kiribati, 2009). One i-Kiribati manager boasted: "there was quite a big turn-out, and the hits on the website, it's quite high, which reflects the success of the KAP" (KAP, 5 May 2010). However, coordinating this performance for the international stage was a contested process, a careful negotiation between scientific presentations and dramatised video footage. In one case, this negotiation occurred between the i-Matang managers and employees of the KAP, and the i-Kiribati media contingent (who double as the country's romantic-comedy producers and directors). The media contingent consists of a writer and a director. The writer is "of the culture she is able to write for the audience, she knows her audience" (according to the director; NTNK Video, 27 May 2010). But the director, originally from New Zealand,

> had to learn a lot about telling a story... that people here will sit for hours if they are entertained. A 30 minute comedy skit for example, people think you are being mean for making it so short. It's also an oral culture (NTNK, 27 May 2010).

When making the video for the Copenhagen event, the KAP management personnel wanted to edit one of the video presentations, as it made false claims about the effects of climate change. A water engineer with the KAP complained that the video presentation made claims about storms that were unseasonal and unprecedented in intensity and frequency, but that these storms were within the normal range of weather conditions for Kiribati. On the other hand, the i-Kiribati media contingent told the story in the Kiribati way, drawing from oral histories, their personal connections to Kiribati. They believed that the i-Matang scientists and management didn't know about story-telling, how to communicate a "heartbreaking presentation", or about Kiribati. The KAP Manager cutting short the video

> thought he was the media expert, but really the side event is like theatre and [he] doesn't have the mentality or the training to know how this works... People at the side event who viewed these were weeping (NTNK Video, 27 May 2010).

Anecdotally, this disagreement was heated and has left participants unwilling to collaborate in the future. Performing vulnerability on the international stage was fraught with politics of truth-claims and values, and struggles about what constitutes scientific data sufficiently rigorous for assembling Kiribati as the vulnerable nation.

At the heart of these struggles are contested ideas about how to perform vulnerability: scientifically, using animations of inundation, or affectively, using heartfelt pleas to protect disappearing islands and their way of life. In turn, contestations over how to perform are informed by a desire to convince the international audience of the i-Kiribati vulnerability. The performances of vulnerability in Copenhagen, was an intentional and conscious one. The performers scripted and rehearsed their performance, altering its intent or core message after practising. There were also costumes: the scientists and government officials wore suits and ties, and the i-Kiribati dancer who performed live wore the traditional coconut skirt and flower headdress, and all involved wore beads or flowers in the hair.

The i-Matang management consultant who was conscripted to get the project back into shape and completed on time, also directed the proceedings in Copenhagen. In a frank discussion with this manager, he confirmed that the main goal for the Government of Kiribati in sending a large delegation to the COP was to "demonstrate their vulnerability and lobby for funds." As another KAP manager put it: "the Copenhagen strategic interest is that you owe us [Kiribati]" (Consultant to the World Bank, May 15 2010). Yet another suggested:

> and it seems to me that some of the people anyway, going to Copenhagen saw the main focus being how much money can we get from proving we're the worst, rather than how can we get the best outcome in terms of other, you know, efforts (Consultant to the World Bank, 26 May 2010).

The management consultant rejected this approach, reframing the side event performance as "go[ing] to explain the challenges and the actions and the importance... [not going] with a begging bowl because people will respond to that by turning away and backing off." Here, he provided the overall goals of the performance of vulnerability, so as to concentrate on the challenges and actions of vulnerability, and the KAP, rather than directly demanding funding (perhaps this was intended to 'sell' vulnerability more strategically to funders). The manager's active and intentional directing of the performances was as precise as deciding how long each presentation would be ("he always wanted to cut us shorter"; NTNK Video, 27 May 2010).

There are many other instances of the organised, public performances of i-Kiribati vulnerability. Recently Tarawa hosted a 'Climate Vulnerable Forum' called the Tarawa Climate Change Conference (TCCC; the most recent iteration of the conference where the government officials from the Republic of the Maldives signed a declaration under water, itself a display of the vulnerability of another nation). One moment of the TCCC involved media personnel and delegates witnessing the planting of a sign recognising, and celebrating, the highest point on the atoll of Tarawa at three metres above sea level. The audiences for these diverse performances are international and varied. At the Copenhagen event, other small island state officials, journalists and NGO officers watched, whereas at an event described below the audience were the public servants of the vulnerable themselves. One of the primary aims of the TCCC was to invite journalists, politicians and public servants from polluting nations to convince these nations to act

and to broadcast this message in their homelands (MFA, 1 June 2010). For instance, a National Public Radio 'blogger' was invited to Kiribati to report on the TCCC in variable dispatches. In one, there were simple descriptions of what Kiribati is: "I can testify that Kiribati is indeed a real country, because I'm in it: sitting on a sliver of land roughly halfway between Australia and Hawaii" (Reed, 2010a). Another reported on the Ambo Declaration from the TCCC that "President Anote Tong hopes will spotlight how vulnerable his nation is to any rise in sea levels and severe weather" (Reed, 2010b). The blog was also enrolled to perform vulnerability, describing the effects of sea level rise:

> Coconuts have gotten smaller. The well water tastes salty. Rain doesn't come when it's supposed to. Fish are fewer and farther out from the shore.... There are dead coconut trees everywhere: tall, headless pillars, which make it feel like an ancient ruin, the site of some lost civilization (Reed, 2010c).

These events are the very public and internationally oriented demonstrations of vulnerability and not examples of the everyday performances. But these outwardly focused performances constitute vulnerability in Kiribati.

4.3.2 Materialities of performances

Vulnerability in Kiribati is performative: it *does things* – producing new identities and new vulnerabilities (I will explore this further in the following section). However, the performances of vulnerability are subject to and enabled by material limits. In other words, these performances – actions – are embedded within socio-technical arrangements, or *agencements*. Vulnerability is only brought about in the context of the *agencement*. In different *agencements* different vulnerabilities are, and can be, enacted.

In Kiribati, the *agencement* that forms vulnerability consists of the production and availability of statistics – or matters of fact – about Kiribati. The performances of vulnerability draw on and act within, an arrangement of facts about the nature of climate change in Kiribati and tropes about the underlying condition of life and living. At the Copenhagen side event, the KAP consultant was able to enact vulnerability when armed with statistics, quoting at length the current and future parameters of sea level rise, wave strength and salt-water inundation (and not, for instance, discussing how i-Kiribati people perceived their vulnerability, or what they want to do about these changes). Another participant encouraged the government to "keep banging the drum" about the vulnerability of Kiribati (NTNK, 27 May 2010). This participant used the comparisons of Tuvalu – which only has 10,000 people and is linked to New Zealand – and the Maldives – which "has 300,000, but they can buy their way out". In contrast, in "Kiribati there are 100,000 ill-educated people". This Copenhagen side event participant was able to perform Kiribati as 'the vulnerable of the vulnerable' by drawing forth the material conditions of life in Kiribati: there are many people (more than Tuvalu), they are poor(er, than the Maldives), and they are ill-educated. By using these examples to bolster claims, the performers and their matters of fact together make a socio-technical arrangement which enacts vulnerability in Kiribati.

These statistics do not only come to life when performed by the climate scientists or the Copenhagen participant. Indeed, these matters of fact have a life of their own. Statistics about sea level rise mingle with images (photos, graphs, videos as well as images seen in person) of waves crashing against fragile, home-made sea walls protecting delicate family houses. This partnership is mobile, travelling amongst consultants and a recent flourish of media personnel, arriving on the front page of newspapers in Australia (Morton, 2009)) or on blog-posts in the United States ('The Two-Way', Reed (2010a, 2010b, 2010c)). Tropes and statistics about over-population, for

example, are also active, transforming in their journeys from one consultants mouth to another's. One consultant to the KAP recounted, matter of factly, that each and every woman has 5 to 6 children (in turn impacting profoundly how much water each family has access to). An i-Matang KAP manager insists that each woman has 4 children, possibly 5, whilst at least 60% of people are under the age of 25, themselves fertile for reproduction. Another consultant insisted 7 children per family, each of whom then has 7 children. The point here is not which one these statistics is correct (although these statistics are gross overestimates: the 2005 Census finds that "the average number of children born alive to all women (average parity) was 2.6 children per woman" (Kiribati Statistics Office, 2007, p. 13)) but rather that they transform as they travel from one i-Matang to another. And as they travel, they inspire those they affect to act, or to be concerned about the plight of overpopulated-and-subjected-to-climate-change Kiribati. These statistics have a life of their own, arising, being active and being transformed. These matters of fact are also the context, or the background, through which performances make sense. Performances constantly reference, or cite, these statistics creating a constellation of citations, through which performances of vulnerability come to matter.

The material conditions of Kiribati – its low-lying nature; its fragile source of freshwater; its small size; and lack of education infrastructure – and the material conditions of climate change – sea level rise, storm surges and wave strength – are required actors in the *agencement* that makes vulnerability (like Callon and Law's (1995) managing director). Performers who enact vulnerability rely on these matters of fact in order that their performances make sense, resonate, and bring into being the vulnerability of Kiribati. These materialities limit, but also enable the bounds of what is possible to perform, so that Kiribati becomes the 'vulnerable of the vulnerable' whilst the Maldives is quite simply 'vulnerable' (as they are richer). These statistics

are carefully chosen to accentuate vulnerability; assemblages of matters of fact do not represent the strong social ties in Kiribati, for example the church, or family. Similarly, they are not suggestive of the vast resources that the Government of Kiribati does possess. For example the potential for bolstering GoK finances – in size and sovereignty – were they able to police their large fishing resources and thus extract payments for all of the fishing conducted in their Exclusive Economic Zone (much of which currently is illegal).

4.3.3 Performative vulnerabilities

In the following section, I suggest that vulnerability is enabled through collections of actors, materialities and their performances. I examine how vulnerability is enacted and with what effects. Drawing on the example of the Association of Pacific Island Legislatures conference that I attended in Tarawa, I analyse whether this collective is changing the nature of vulnerability in Kiribati. As a result of and alongside these performances, the official development assistance landscape is changing, and a climate change agenda is emerging.

A performance of vulnerability I witnessed whilst in Kiribati involved a conference with international delegations, including policy makers and business people (and interested researchers such as myself). This small conference in Tarawa – the Association of Pacific Island Legislatures, or APIL – was organised to bring together Pacific Island bureaucracies to draft a legal statement about their commitments and vulnerabilities to climate change. By chance, the previous day two atoll-scientists familiar with the plight of Kiribati released a scientific journal article which provided evidence that several islets in Tarawa are actually growing, not shrinking under rising seas (Webb & Kench, 2010). Although the reasons for the growing atolls related to shoreline manipulation and natural processes, and the growth probably will not alleviate

Kiribati's plight, numerous news stories were run which could be interpreted as questioning the vulnerability of atoll countries in the face of sea level rise.

For example, McDonald (2010), of the Australian Broadcasting Corporation, reports that "Associate Professor Paul Kench, a member of the team of scientists, says the results challenge the view that Pacific islands are sinking due to rising sea levels associated with climate change." Professor Kench continues: "we've now got evidence the physical foundations of these islands will still be there in 100 years" (McDonald, 2010). The evidence collected using aerial photos and satellite images, suggests that "the growth of the islands can keep pace with rising sea levels" (McDonald, 2010). Similarly, the Telegraph reports that the Pacific islands which are commonly viewed as "'poster child' examples of the threats from rising sea levels are expanding not sinking" (Chapman, 2010). Both of these examples caution, albeit towards the ends of their reports: the "two scientists warn that people living on the islands still face serious challenges from climate change, particularly if the pace of sea level rises were to overtake that of sediment build-up" (Chapman, 2010). In other words, Webb and Kench's (2010) results do not completely liberate Kiribati from the perils of sea level rise.

Meanwhile, during the conference a government climate change advisor assembled a lengthy presentation, performing vulnerability by quoting numerous scientific estimates of sea level rise and the 'multiplying' factors in Kiribati, including poverty and overcrowding, which conspire to make Kiribati one of the most "vulnerable of the vulnerable" (Government of Kiribati, 2010c). Notably, the government climate advisor drew solely from consultant reports and international scientific projections produced by technical assistants (from Australia, New Zealand or the United Kingdom) with expertise in climatology and atoll geography. An Australian businessman attending the conference had clearly seen the recent Australian

headlines; he questioned the government climate advisor, suggesting that perhaps Kiribati was not quite as vulnerable as the lengthy statistics implied. It was one technocratic science against another. Rather than acknowledge the published atoll-scientists arguments, that the atolls were in fact accreting coral sands, the government scientist rejected the suggestion that Kiribati was growing and drew on his alarming statistics of sea level rise and its financial toll, his argument bolstered by observations about overcrowding, poor sanitation and poor health in the Kiribati housing sector. Furthermore, the government scientist claimed that the Webb and Kench report was in fact produced from 'questionable' science. Interestingly, the scientific reports for the KAP and the article that attracted such media attention were written by the same person. The two perspectives do not inherently disagree; remember that Webb and Kench (2010) acknowledge Kiribati is still vulnerable to the effects of sea level rise. Instead, the two sources simply reflect on different data (one collected using water gauges and models, the other from aerial and satellite photographs) about complex atoll geology, which our science has not completely (if it ever could) comprehended.

The above demonstrates another instance, or staging, of the performances of vulnerability. What is in question is: are these performances performative; that is, whether these performances bring into being – make or remake – Kiribati's vulnerability to climate change. There are several ways of gauging this: are people convinced by the performances of vulnerability (the Australian businessmen was not, for example); are the i-Kiribati people *more* vulnerable as a result of the performances; and are the i-Kiribati people vulnerable in ways they were not previously? In other words: do these performances have material and discursive consequences for the vulnerability of Kiribati itself? I did not conduct a vulnerability assessment to test the hypothesis that these performances are performative in the quantitative sense of

increasing vulnerability. To some extent, to posit that there is some hierarchy of vulnerability would be counter to my argument. Instead, I am suggesting that vulnerability is not simply, or not only, a condition that exists (and thus could be measured in such a way), but rather it is made, or enabled, through collections of actors, performances and materialities. Assessing how vulnerability is enacted through these collections of things, then, involves examining this very collective.

Even if the Australian businessman questioned the government scientist's performances of vulnerability; that he attended the APIL conference at all is suggestive. As mentioned, this conference aimed to bring together Pacific Island public servants and business people so that they might share ideas and experiences about how to adapt to climate change. This is not the setting for a climate denier, or a 'vulnerability denier'. Rather, that these diverse interests from across the Pacific – from Hawaii in the East to the Federated States of Micronesia in the West – came to discuss (and perform) their vulnerability suggests that the attendees do in fact believe in an emergent vulnerability enacted in these performances.

The nature of the official assistance regime is changing, as a result of, and in conjunction with performances of vulnerability. A climate change agenda is emerging, alongside the longer-term Official Development Assistance focuses. There is one hotel in Kiribati where all the consultants and technical assistants stay when they visit: Mary's Hotel. One evening when I dined at Mary's I conversed with various visiting consultants. Across from me sat a labour relations bureaucrat from New Zealand (consulting for NZAid) who was assessing potential changes in temporary migration regulations, facilitating i-Kiribati labourers to travel to New Zealand and Australia and fill shortages in areas such as agricultural labour (and that may in the future alleviate the stressors on atolls due to climate change). This bureaucrat was wedged

between a World Bank manager and an Asian Development Bank manager who were in town to meet with the Ministry of Public Works and Utilities to discuss building a new 'climate-proofed' road through Tarawa. On either ends of the table were a World Bank manager and a technical assistant who were working on a renewable energy project (to reduce the effects of climate change and thus demonstrate to other states and donors that Kiribati is serious about reducing emissions). Whilst they exchanged expletives about the changing roles of the World Bank and other unilateral aid institutions (at one stage, hilariously, calling the United Nations "socialists with their Millennium Development Goals"), I began to realise that climate change adaptation is becoming the main game in town. And the consultants recognise this too: both of the road consultants complained about their directives to 'climate-proof' the road; the first because he was now unable to get funding for other projects (World Bank, 7 May 2010), for example health projects; the second because the climate change agenda: "it's wasted fun, and fluff around the serious projects, like the environmentalists, economists and feminists beforehand" (Asian Develoment Bank, 7 May 2010). This consultant makes an astute observation, even if he is disparaging to many serious development concerns. In Kiribati, there are now projects about reducing vulnerability by limiting reef mining, by installing better rain water tanks, by slum clearance to name a few.

In contrast, many of the long-term donors to Kiribati are not solely focused on a climate change agenda. The donors who have supported the Kiribati Adaptation Project – AusAID and NZAid – have much larger ODA investments in other areas. The Australian government has long term commitments to education programs and economic governance in Kiribati, most recently signified by the signing of the Kiribati-Australia Partnership for Development in 2009. The Partnership pledges investments in and aims to: improve basic education; develop workforce

skills; improve economic growth and economic management. Similarly, the New Zealand Government's Kiribati Country Strategies over the last ten years aimed to "improve educational outcomes, improve public sector performance... human resource development and urban renewal." In 2008, New Zealand began the Sustainable Towns Programme which aims to address over-crowding and associated public health and environmental problems (NZAID, 2009).

Major investments in Kiribati by two of its largest sources of Official Development Assistance are primarily in the fields of governance and education. These flows reflect the long-standing development and strategic priorities of both funders and recipients. As one of the New Zealand development officers explains:

> Q: How were these goals decided upon? Who decided the goals?
>
> A: The proposal has to come from the government [GoK]. So for New Zealand, for NZAid, they normally have bilateral talks where are activities are agreed. But basically the proposal has to come from government because they know more on what they need. So in these talks they discuss the priority activities for the government of Kiribati...
>
> Q: But does the NZAid determine their strategic focus areas?
>
> A: Yeah they do have a strategic focus.
>
> Q: ...So who decides what the strategic focus areas are?
>
> A: NZAid, I think it's from the government of NZ personnel, we are under the Ministry of Foreign Affairs, they are the one that decides that. (NZAid, 8 June 2010)

In sum, long term partnerships are developed in negotiation between funders and recipients; what the recipients want, or know they can get given the strategic priorities of the funders. Until now, and over the last ten or more years in Kiribati, major programmes are focused on education and governance. The same conclusions cannot be drawn about the long-term partnership of Kiribati and the World Bank as the KAP is the Bank's first investment in Kiribati.

However, climate change adaptation appears to be on the tips of most of the funders priorities; this is an emergent agenda. Consider the following examples from some of the major funders in Kiribati. The (New Zealand supported) Sustainable Towns Programme is creating "a new climate proofed subdivision in South Tarawa for up to 1,000 people." The UN's joint program office is keen to communicate that they will be investing in climate change adaptation through their focus on water, health and sanitation, especially by implementing the European Union water project (although, they do not really know how; United Nations Joint Program, 8 June 2010). The Japanese International Cooperation Agency only supports volunteers in Kiribati, yet recognise that "new challenges, particularly the financial crisis and climate change have induced fundamental changes in the political economy of the developing world as well as the international donor community" (Japan International Cooperation Agency, 2009, p. 2) and have adjusted their program accordingly. One of the major projects implemented by the Taiwanese Technical Mission (in many islands throughout the Pacific) is focused on agriculture, horticulture and livestock and aims to improve the sustainability of the islands and their food production (Taiwanese High Commission, 7 June 2010). The High Commission recognises that Taiwan and Kiribati are both small islands affected by climate change:

> [The] Taiwanese see the TV and announcements from His Excellency Anote Tong, and they want to help. The government is working in cooperation with projects, still thinking

about how it can help to decrease the effects of climate change. (Taiwanese High Commission, 7 June 2010).

Long-term development programs remain focused on a non-climate change agenda. However, donors are keen to communicate that climate change is a fundamental concern for their funding regimes in Kiribati. This is articulated, in many cases, by new and emerging climate change adaptation projects.

Government officials in Kiribati also recognise that this framing has changed:

A: ... Because we have been told there are climate change facilities are available, so we are trying to tap those, not missing those. So as a result I think we are starting to see, some climate change, as one of the top issues. You may have heard our President is very vocal, wherever he goes he will be talking about climate change. Because he is doing that, we make sure to support him and show it is an important national issue for the government, we are serious about it and working on it, and try and get as much support as possible for donors. We try not to wait, but to go forward.

Q: So most projects have [a] climate change slant?

A: Yes, because you know what, the donors are telling us that we can only get this funding facility if there is a climate change measure, so that's what we've been doing, trying to make the design take into account climate change, addressing climate change issues, and that way we will get the funding, and that's what we are doing now. And the donors are advising us, if you want to get this funding you have to do this and this and this.

Q: Some important projects aren't being funded?

A: I think there are also, existing, initial funding facilities for normal projects before climate change. Those are still maintained, we will maintain that and donors will. I haven't seen cases where projects are returned because they haven't met the climate change criteria. (MPED, 18 May 2010).

Performances, funding regimes and other materialities are reframing Kiribati and its development assistance regime in terms of vulnerability to climate change. Climate change adaptation is a paradigm, a discursive frame, and a meta-trope of development assistance, which is shaping the way consultants and funding sources are distributed. The major sources of development assistance in Kiribati are embarking on climate change adaptation; they are beginning to shift at least some of their emphasis from other development concerns. The consultants I met in Mary's hotel were setting up new projects to address climate change, and the project officers in permanent programmes discussed their outlooks for climate change adaptation. Of course, I cannot trace causality here: I cannot claim to know whether the types of performances I described above are leading to this paradigm shift in development assistance. On the one hand the projects require these performances – making a population vulnerable in order that they may receive projects, and become less vulnerable. On the other hand, the projects and consultants actively participate in the performances, providing the data, images and videos – stage props, if you will – that are required to assemble vulnerability. It is difficult to know which comes first. However, together, the performances and funding and project regimes are creating very particular frames of social life in Kiribati, as vulnerability to climate change.

Alongside the discursive effects of the vulnerability assemblage, there are material consequences. When these consultants spend all their energy and money on reducing vulnerability to climate change, they also require that the Government of Kiribati spends its time facilitating the reduction of vulnerability to climate change. Rather than conducting themselves as an autonomous self-government, the best and brightest public servants court consultants, administer projects and attempt to attract new sources of funding. When each new group of managers or technical assistants arrives in town they meet with the same select i-Kiribati public servants – those with the best English and the best education – in the Ministries of Environment, Lands and Agricultural Development; Public Works and Utilities; Interior and Social Affairs; the Office of the President (in charge of the 'cross-cutting' issues of climate change and disaster management). When the i-Kiribati public servants are not meeting with consultants within Kiribati they are attending trainings and meetings all over the globe. For instance, I tried to meet with a senior public servant in the Environment division. For the six weeks I was in Kiribati the senior staff was in Nairobi, Stockholm, and then Brisbane to attend meetings and trainings (without even touching down in Tarawa). And as these best and brightest public servants perform their vulnerability to those with the funds, they are not running the country (but they are trying to finance it). As one i-Matang employee of the KAP noted (in stark contrast to the Ministry of Planning and Economic Development official quoted previously):

> Again, my personal view. I would personally remove the word climate change from the KAP and wipe it out of the vocabulary of the country for five years. And no one would be able to use it... But I think at the moment, I have also been to meetings where there are discussions about how we are going to get money... I think the danger here is that we are creating a culture of, 'it's their [the donor's] problem they should come and fix it'. What

> do they call it, not a charity, aid dependence? ... Because there is so much climate change money going around. Yes, Kiribati is in huge danger, we are. Climate change will have catastrophic effects, but in the mean time, we have huge problems (Consultant to the World Bank, 10 May 2010)

The KAP employee continued to reiterate her frustrations at attitudes in the government:

> And the other part is... I went to this meeting and we were discussing water issues, this head of a ministry, who will remain nameless, [says] 'it's Australia's fault so they've got to give us something and they've got to give us a desalination plant or something... It's their fault so they've got to give us one to solve the problem. It's from Australia they've got to do it.' ... That's why we need to remove that word, climate change.

Another consultant agreed, suggesting that climate change is distracting from other concerns:

> Climate change is different from other things in that they do have a claim here, they can genuinely say it's not our fault and we need to be compensated. But, on top of that, and not climate change related, the health statistics in Betio should just not be happening, especially the maternal and child health stuff. We saw the hospital today. Sure, climate change exacerbates this, but Betio is a basic development problem, there needs to be much improved sanitation and water supply (Consultant to the World Bank, 15 May 2010)

Yet another manager with the KAP discusses how climate change adaptation planning means that the Government is missing out on improving the everyday and current livelihoods of its people:

> The official government position on climate change is that others are responsible and others should therefore do what is needed here. This is the key in ... [the climate change adaptation] framework... What is missing though, is what is to happen between now and then and for those who can't migrate. There should be a focus on improving the quality of life between now and then and these questions should be dealt with in a whole of government approach in the OB [Office of the President] (World Bank, 16 May 2010).

There is the risk that while performing vulnerability on various stages – at conferences, international meetings and in everyday meetings with consultants – the government is not focusing on increasing resilience to climate change in Kiribati (nor on the other elements of running a successful government). For instance, rather than focusing on improving the provision of water so as to increase the population's resilience in the face of increasing water insecurity due to climate changes, the government instead concentrates on the politics of blame so that the Australian Government might provide them a desalination plant. Despite the overarching goals of increasing capacity through project planning and the provision of funds, the constant emphasis on procuring projects and pleasing consultants is in fact changing the nature of vulnerability. This may not be a new occurrence: previously the GoK focused on procuring development assistance. But the results are still pernicious. When the government is convincing funding agencies to build concrete sea-walls, at the same time they are not focusing on implementing locally achievable, well-practised, 'traditional' techniques for increasing resilience and reducing vulnerability (according to my and many interviewees observations), such as relying on varied food sources (from the land, the reef or the ocean) and water sources (from the sky, the ground and coconuts). Another well-practised technique is mangrove planting to protect from erosion and storm surges, which the GoK attempts in ad-hoc projects throughout the islands. Not only is

planting mangroves effective at reducing erosion on the lagoon side of the islands, it is also relatively cheap and easy and is not known to have such repercussions as changing the shape of islands, unlike building sea walls (although planting mangroves is only appropriate on the lagoon side of the islands, and cannot provide protection on the ocean side).

At the same time, to perform vulnerability to those with the money is a false choice. The Government of Kiribati is so dependent on external funding for capital expenditure, policy research and any other cost that is not paying government salaries and subsidising State Owned Enterprises, it seems that public servants and others have little choice but to chase these funds. These performances are the entirely rational way to attract money; public servants and others have little choice but to perform their vulnerability. This speaks to the *financial* lack of capacity that I introduced in the previous chapter. As I suggested there, the KAP consultancies do not simply wash over government actors and practices, but rather enrol them in their projects. Performing vulnerability is one of the costs of being prisoners of this complex, but at the same time, there is little option to get out of the complex.

As I have suggested above, there are both discursive and material changes in vulnerability as a result of these performances. Kiribati comes to be seen solely within the bounds of climate change: it becomes the place only of vulnerability. The framing of Kiribati in this way (vulnerable, lacking), in turn, influences the terms of debate for climate change adaptation: vulnerability is a discourse. There are material consequences, too, of these performances. The acting-out of vulnerability determines the flow of finances to and from Kiribati. The performances also determine the limits of government action – what is acted upon, what money is spent on and so on. And there are qualitative changes in vulnerability such as dignity and autonomy in decision making due to these performances; the Government has

significantly less freedom to choose its own program of action for governing when the finances for these actions are provided by Official Development Assistance, with its apparatus of review, evaluation and strategic priorities. Of course, given the financial constraints of the government, there is little freedom anyway.

4.4 Conclusions

I follow Findlay's (2005) suggestion that social theory may be an axis for understanding vulnerability. In particular I draw on theorisations of performativity and *agencement* to understand what makes Kiribati vulnerable. Firstly, I argue that vulnerability is a performance on various stages for multiple audiences. These performances are performative, they are both disciplining and productive. Armed with statistics, graphs, diagrams and videos, i-Kiribati and i-Matang scientists, economists and engineers, "do, say, 'act-out'" (Gregson & Rose, 2000, p. 441) Kiribati's vulnerability. Of course, there are limits to these performances and not everyone can perform vulnerability equally: it is when bolstered by tropes of under-development and statistics about climate change that vulnerability can come to life.

Secondly, I argue that these performances are performative; creating new identities and influencing the nature of vulnerability. I suggest that by performing vulnerability, the i-Kiribati people and the Government of Kiribati are beginning to shift resources from 'development' projects, creating a new framing of social life in Kiribati. And while they are focusing on assembling their vulnerability for international audiences, consultants, institutions such as the World Bank and other donors, and the GoK are not focusing on increasing the strength, capacity and independence of the GoK. For example, GoK financial capacity to govern, without doing the vulnerability dance to the World Bank's tune, would be significantly increased if they were able to police their Exclusive Economic Zone from illegal fisheries. Similarly, if the GoK had the

legal muscle to bargain effectively with buyers of the fishing rights they might be able to extract greater rents from this crucial resource. Yet this seems beyond the consideration, or compassion, of most donors, especially since many of them currently buy fishing rights for the Kiribati EEZ.

The performance of vulnerability, and the performative nature of these assemblages are just one of the over-flows from climate change adaptation projects. The KAP, and other projects, don't only transform that which they touch, as specified by their Terms of Reference or project goals, but also have unintended effects. In this instance, the requirement that vulnerability be performed re-shapes the very nature of vulnerability in Kiribati, potentially re-directing finances away from traditional 'development' projects and limiting the freedoms of the Government of Kiribati.

5. **Conclusions: Entangling adaptation**

In essence, this thesis used a case study to answer the question: what does a climate change adaptation project do? I showed that the Kiribati Adaptation Project attempts to govern climate through technical models and projections. However, this study of the KAP revealed that adaptation projects also produce unintended effects, or overflows.

I explained what the Kiribati Adaptation Project has achieved, and I analysed the limits of adaptation projects. The KAP is a critical case study for answering the above question for two primary reasons. First, effective climate change adaptation is essential for Kiribati. Kiribati is critically vulnerable to climate change. Even if the greatest mitigation efforts are launched immediately, some climate change is still inevitable in Kiribati due to lag-times and the long lifetimes of greenhouse gas emissions. Second, the KAP is a site of experimentation in climate change adaptation; the place where the World Bank has begun to build its expertise in adaptation. Although this thesis is built around a case study, the findings are relevant beyond Kiribati. In particular, this is a preliminary study of some of the effects of an adaptation project as it rolls out on the ground.

The introduction framed my research concerns amongst critical development and policy studies. This literature informed my research questions, prompting investigations of *what else* (aside from attempting to respond to climate change) do adaptation projects *do*, beyond their strict terms of reference. While development – the focus of critical policy and development studies – and adaptation are not the same thing, they are similar. I suggested that climate change adaptation is a new policy paradigm in 'development' institutions. In particular, the project at the centre of my research was implemented in the same financial and institutional circuits that are the focus of much critical policy and development studies: the World Bank. As a consequence,

the knowledge produced about climate change in Kiribati is produced by the same experts within this institution, and the project must follow the rigid project practices set down by the World Bank.

In chapter two, I assembled numerous moving parts. I purposefully distanced this study from those that have previously investigated climate change adaptation attempts, which have centred on battles to define and categorise certain decisions and practices, and argue as to which constitutes the better strategy. These assessments of adaptation strategies involve hypothetical adaptation practices and climate impacts to estimate the extent to which adaptation may alleviate climate change (Smit & Wandel, 2006). Amongst these hypothetical studies there are no bodies, no active agents. Instead, the prior work in the field seems to assume that plans and policies simply spring forward of their own volition, without recognition that people are required to instigate and implement them. Adaptation studies constitute a design centric policy discourse: studies of adaptation largely refer to planning, rather than executing, adaptation (Jerneck & Olsson, 2008).

In chapter three, I sought to understand why the KAP has (so far) focused so heavily on producing calculations and measurements. I demonstrated the extent of this technical focus, by detailing three sub-components of the KAP: sea level rise monitoring, best-practice sea wall design and fresh-water lens modelling. By exploring these technical practices in detail, I describe project accomplishments and their complexity. I showed that each of these three project components sought to separate the diverse effects of climate change, in order that these changes can be addressed through environmental governance techniques. Climate change adaptation, I suggested, is climate governance. In sum, I showed that one of the roles of this vast calculatory apparatus was to enable climate governance *through* climate change adaptation. Climate

governance operates through disconnected parts; according to this logic, adaptation is simply the sum of these parts. Climate change adaptation requires governance, entails governance, but that is not all the climate change adaptation does.

These calculations do not only enable climate change governance. In the case of the KAP, they added legitimacy to claims that the KAP is exploring new adaptation practices. The perception that adaptation is being put into practice is required for various audiences: the KAP's financial backers (such as the GEF), its implementers (the World Bank), and also for the country itself. Thus, the KAP's calculatory practices are as much about establishing information about climate change in Kiribati in order to facilitate adaptation as they are about articulating World Bank expertise in adaptation projects.

In chapter four, I analysed another 'overflow' from the KAP. I reviewed previous conceptualisations of vulnerability, and followed Findlay's (2005) suggestion that social theory can add a useful dimension to understanding this term. I used theories of performativity and *agencement* to suggest that vulnerability is assembled by intentional agents in Kiribati. I maintained a theatrical sense of performances; that they are the actions of intentional actors, they have various audiences with expectations to be fulfilled, as well as a director, who is managing and guiding the performance. However, these performances only make sense when they are assembled in *agencement*: collections of actors and material things with the capacity to act in their coming together-ness. These assemblages remake vulnerability in Kiribati. I argued that these performances are performative; they create new identities – the vulnerable subject – and influence the nature of vulnerability, both materially and discursively. By performing vulnerability, the i-Kiribati people and the Government of Kiribati may shift resources from development projects and create a new framing of social life in Kiribati as vulnerable to climate

change. While they are focusing on assembling their vulnerability for international audiences, this collective of consultants and public servants could be working towards political economic freedoms, such as building their fisheries licensing industry. Rather than concentrating on fulfilling government obligations, or exploring well-practiced adaptive techniques – such as mangrove plantations – the Government of Kiribati *chases* adaptation funds. This framing also leads to Kiribati being re-created as uni-dimensional and singularly vulnerable: Kiribati becomes nothing other than a place of vulnerability. Of course, there is no choice but to perform their vulnerability to those with the funds; the Government of Kiribati is so dependent on this money.

5.1 Research questions

In these empirical chapters, I answered the following research questions:

1. What work does climate change adaptation do as an organising principle for a project?
2. How is climate change adaptation as a policy articulated into grounded practices?
3. What are the unintended effects of a novel climate change adaptation project in an archetypical vulnerable place?

Chapters three and four each articulated answers to these questions (to avoid repetition, I will briefly summarise where and how I answered these questions). In response to research question one, I showed in chapter three that climate change adaptation is more than the sum of disparate climate governance parts. I suggested that climate change adaptation is an organising principle for the KAP, allowing the project to be re-oriented as a novel experiment in adaptation practices. I showed that through extensive numerical predictions and projections, the KAP attempted to transform itself from standard project practice to cutting edge climate change adaptation. Evidence of the KAP's best practices are most important for those outside of the

project, for the World Bank, as the funder and implementer of the project. In the process of implementing the KAP, the World Bank has developed a demonstrable and novel program of expertise in climate change adaptation. In sum, climate change adaptation as an organising principle for a project works to position these practices – climate change governance practices – as a new and more expansive paradigm, a more encompassing development concern. Similarly, in chapter four, I suggested that climate change adaptation orients framings of social life in Kiribati. Projects such as the KAP have been instrumental in assembling the people of Kiribati's vulnerability to climate change. Armed with the aforementioned statistics detailing precise projections of sea level rise, government officials and climate spokespeople perform their vulnerability for interested onlookers. Along with facts about the material conditions of life in Kiribati, vulnerability to climate change is assembled so as to attract funding and concern.

Responding to the second research question, I suggested in chapter three that climate change adaptation was articulated in the KAP through technical reports which outline the nature and extent of expected climate change in Kiribati. In examining these reports, I demonstrated what a real-life adaptation project consists of. And if one considers that the KAP represents 'success' or 'best-practice' in climate change adaptation practices, then these practices consist of technical reports. Amongst these technical reports, the KAP attempted to change government processes, to encourage climate-sensitive planning. In this respect, adaptation is process oriented; it aims to 'add-on' climate change concerns to traditional modes of planning; climate change is thought to be absorbed in a transformative way into existing developmentalist planning. This is obvious in two examples I considered – groundwater planning and sea-wall construction. In contrast, the KAP is not outcome focused: it is not concerned whether or not these climate-adjusted processes are effective in achieving adaptation. Instead, the KAP presumed that

supplying information about climate change will automatically lead to appropriate adaptation decisions.

In chapter four, I examined how climate change adaptation works institutionally. In this nascent stage of adaptation projects, the relationships between funders, implementers, government officials and recipients are still unfolding. The Government of Kiribati must constantly perform its vulnerability to climate change to diverse audiences, so as to attract funding and attention. Yet, the funders have at least as much to gain from implementing these projects: the KAP is a cornerstone in the World Bank's claims of expertise in adaptation, which has attracted future financing opportunities.

The 'grounded' practices of climate change adaptation are primarily instigated by actors. These active agents in implementing the KAP were introduced throughout this thesis; they are the informants in my study. Many of the traditional actors from development projects are present, including (i-Matang) project managers, management consultants, technical assistants and economists. In fact, many of those implementing the KAP were involved in more traditional 'development' projects (primarily projects with an environmental or ecological slant) prior to their involvement in the KAP. For instance, one of the early KAP project managers had worked in Indonesia, implementing a project which aimed to protect coral reefs. Numerous engineers also worked, in various capacities, for the KAP; some as advisors, some as technical assistants seconded to the GoK, some as consultants. In addition, climatologists played an essential role in 'practising' the KAP, creating the projections and models for the project components. Although climatologists are novel actors in implementing World Bank projects, they come from the same established locations of scientific knowledge production as many of the other i-Matang consultants – New Zealand, Australia and the United Kingdom. There are also i-Kiribati actors in

the KAP, including many government officials and local project directors/managers. Oftentimes those officials working with/on one externally funded project work on many. They have also, often, received extensive university educations in those same centres of knowledge (New Zealand, Australia and Fiji). Together these consultants, project managers and government officials make a neo-colonial expert network that determine project implementation in Kiribati.

Third, and finally, I identified two of the unintended, or unstated, effects of a climate change adaptation project. Alongside attempts to 'do' adaptation through technical calculations and projections, the KAP acted and continues to act as integral experience for the World Bank and its other funders, as I explored in chapter three. Expertise in adaptation implementation is instrumental in accessing new sources of adaptation funding. Chapter four also examined an unintended effect of a climate change adaptation project. The KAP is integral to the performances of vulnerability; it provided the necessary statistics and paid for and organised the conferences and demonstrations in which some key performances took place. But the KAP and other projects are also a cause of these performances; vulnerability is a required state, before a project is brought in to alleviate it. There is little choice but for these actors to perform; their country needs this money and has few resources to obtain it elsewhere.

In essence, both of these chapters analysed the extent to which that which is being projected, conforms to the projections: in chapter three, whether climate projections can be incorporated effectively into government planning; in chapter four whether Kiribati's vulnerability is re-made by assembling performances of vulnerability. In both instances, I suggested that projections (of climate change, of vulnerability) impact that which they predict and beyond: these projections are performative. However, I do not suggest that such models of the future are performative in the 'hard' sense; that is, neither climate change impacts nor

vulnerability conform exactly to these projections. Even though these projections are extremely, complex and technical, in chapter three I showed that climate change rebels (drawing from Mitchell (2002), Robertson (2000, 2004) and Scott (1998)). The intricacies of climate change impacts and effects cannot be viewed in isolation, and when restricted to projections of sea-level rise, wave strength and groundwater depletion, the complex interactions amongst these components confound. In contrast, in chapter four I suggest that assemblages of vulnerability do threaten to re-cast Kiribati as vulnerable to climate change. But this possibility is contingent and emergent, and many (supposedly vulnerable) i-Kiribati reject this characterisation (instead focusing on 'development' concerns). Whilst the impacts of the KAP intervention are unpredictable, they are nonetheless important to describe and analyse. Recognising climate change impacts as an assemblage of greenhouse gas emissions, climate impacts such as sea level rise, the diverse actors gathered to cope, and the associated actions taken to adapt (including consultants, policies and changing practices) to these changes, invites an analysis of climate change impacts that includes these unexpected overflows.

5.2 Re-entangling adaptation

A final goal of this thesis – although one which is only touched on – is to re-connect climate change adaptation with its origins and causes. Numerous studies have attempted to re-integrate mitigation and adaptation, suggesting that mitigation and adaptation have been erroneously categorised as dichotomous and that this bifurcation must be overcome. Put simply, adaptation and mitigation are both necessary, to avoid the worst case climate scenarios, and because some climate change is now inevitable (Oreskes, Staniforth, & Smith, 2010). Oreskes et al. (2010) show that mitigation is still essential, because there are so many unknowns associated with adaptation; for instance, what conditions will we be adapting to and how much will it costs?

While Oreskes et al. (2010) do not pursue their lines of questioning of adaptation in 'actually-existing' projects, surely my research serves to confirm some of their suspicions. Not only are the know costs of adaptation completely incalculable (as Oreskes et al. show), but there are also unanticipated costs of, or overflows from, pursuing adaptation projects, that could not be anticipated by policy analyses. To lay our climate fortunes in the hands of adaptation is surely perilous, given that it "rest[s] on the assumption that we can reliably anticipate the changes to which we will be adapting and therefore that we can sensibly plan for those changes" (Oreskes et al., 2010, p. 1013). So instead of finding synergies, or the trade-offs, or conducting cost benefit analyses of either policy, it is important to hold adaptation and mitigation in constant tension, in relation. As I argue in chapter three, climate change governance should encapsulate both adaptation and mitigation policies, as they both aim to alter our human and nonhuman relationships through governance techniques.

Mitigation and adaptation decisions should be held in tension as to choose to implement one is to choose not to implement the other. When rich and polluting governments donate to the Green Climate Fund for the World Bank to implement $100 billion in climate change adaptation projects, they are not paying to significantly reduce their own greenhouse gas emissions. These decisions have ethical implications. The proliferation of climate change adaptation projects corresponds with this global recklessness and abdication of responsibility. Yet the effects and effectiveness of adaptation projects is profoundly understudied. Nowhere is this more obvious than Kiribati, where the tensions and asymmetries of mitigation and adaptation are illuminated. The KAP expects to create local resilience in the face of an exogenous threat, in the place least able to be resilient, and least responsible for causing the threat. These asymmetries are only intensified in implementing the project, as when the KAP tries to achieve adaptation it gets

caught in project management gaps and technical holes. Adaptation needs to be considered with the same critical lens as mitigation, including how it might work in practice, its costs, and its social implications. This is particularly true of the emerging international financing regime, which is growing (at the price of mitigation financing). As this thesis shows, there are important and unexpected side-effects from adaptation projects which hamper their effectiveness. This is what happens when the World Bank does climate change adaptation.

Bibliography

Abram, S., & Lien, M. (2011). Performing nature at World's Ends. *Ethnos*, *76*(1), 3-18.

Adger, W. (2003). Social capital, collective action, and adaptation to climate hange. *Economic Geography*, *79*(4), 387-404.

Adger, W. (2006). Vulnerability. *Global Environmental Change*, *16*(3), 268-281.

Adger, W., & Barnett, J. (2009). Four reasons for concern about adaptation to climate change. *Environment and Planning A*, *41*, 2800-2805.

Adger, W., Arnell, N., & Tompkins, E. (2005). Successful adaptation to climate change across scales. *Global Environmental Change*, *15*(2), 77-86.

Adger, W., Lorenzoni, I., & O'Brien, K. (2009). Adaptation Now. In W. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to Climate Change: Thresholds, Values, Governance* (pp. 1-22). Cambridge: Cambridge University Press.

Adger, W., Paavola, J., Huq, S., & Mace, M. (Eds.). (2006). *Fairness in adaptation to climate change*. Cambridge, Mass. ; London :: MIT.

Agrawala, S. (2004). Adaptation, development assistance and planning: Challenges and opportunities. *IDS Bulletin*, *35*(3), 50-54.

Agrawala, S., & Van Aalst, M. (2008). Adapting development cooperation to adapt to climate change. *Climate Policy*, *8*, 183-193.

AMSAT/CSIRO. (2007). *Extreme Event* (Factsheet). South Pacific Sea Level and Climate Monitoring Project. Fiji and Canberra: AusAID. Retrieved from http://www.bom.gov.au/pacificsealevel/pdf/AMSAT_extreme_factsheet.pdf

Asian Development Bank. (2008). *Asian Development Bank and Kiribati* (Factsheet). Manila: ADB.

Bailey, I. (2008). Geographical work at the boundaries of climate policy: a commentary and complement to Mike Hulme. *Transactions of the Institute of British Geographers*, *33*, 420-423.

Bailey, I, & Maresh, S. (2009). Scales of networks of neoliberal climate governance: the regulatory and territorial logic of European Union emissions trading. *Transactions of the Institute of British Geographers*, *34*, 445-461.

Bailey, I, & Wilson, G. (2009). Theorising transitional pathways in response to climate change: technocentrism, ecocentrism, and the carbon economy. *Environment and Planning A*, *41*(10), 2324 – 2341.

Bailey, Ian. (2007a). Neoliberalism, climate governance and the scalar politics of EU emissions trading. *Area*, *39*(4), 431-442.

Bailey, Ian. (2007b). Climate policy implementation: geographical perspectives. *Area*, *39*(4), 415-417.

Bakker, K. (2005). Neoliberalizing nature? Market environmentalism in water supply in England and Wales. *Annals of the Association of American Geographers*, *95*(3), 542-565.

Bakker, K., & Bridge, G. (2006). Material worlds? Resource geographies and the "matter of nature." *Progress in Human Geography*, *30*(1), 5-27.

Barnett, J. (2001). Adapting to Climate Change in Pacific Island Countries: The Problem of Uncertainty. *World Development*, *29*(6), 977-993.

Barnett, J., & Adger, W. (2003). Climate dangers and atoll countries. *Climatic Change*, *61*, 321-337.

Barnett, J., & Campbell, J. (2010). *Climate Change and Small Islands States: Power, Knowledge and the South Pacific*. London and Washington: Earthcan.

Beca Infrastructure, D. (2010). *KAP-II FS6 Improving the Protection of Public Assets. South Tarawa Coastal Condition Assessment* (Client Report No. 6201067). New Zealand: Beca Infrastructure.

Beca International Consultants, D. (2010). *Shoreline Protection Guidelines* (Client Report No. 6201067). New Zealand: Beca Infrastructure.

Berndt, C., & Boeckler, M. (2009). Geographies of circulation and exchange: constructions of markets. *Progress in Human Geography*, *33*(4), 535 -551.

Bickerstaff, K., Lorenzoni, I., Pidgeon, N., Poortinga, W., & Simmons, P. (2008). Reframing nuclear power in the UK energy debate: nuclear power, climate change mitigation and radioactive waste. *Public Understanding of Science*, *17*(2), 145 -169.

Bingham, N. (2008). Slowing things down: Lessons from the GM controversy. *Geoforum*, *39*, 111-122.

de Boer, J., Wardekker, J., & can der Sluijs, J. (2010). Frame-based guide to situated decision-making on climate change. *Global Environmental Change*, *20*, 502-510.

Borovnik, M. (2005). Seafarers, "Maritime culture" and the "i-Kiribati way of life": The formation of flexible identities? *Singapore Journal of Tropical Geography*, *26*(2), 132-150.

Bouwer, L., & Aerts, J. (2006). Financing climate change adaptation. *Disasters*, *30*(1), 49063.

Boykoff, M., Bumpus, A., & Liverman, D. (2009). Theorising the carbon economy: Introduction to the special issue. *Environment and Planning A*, *41*, 2299-2304.

Boykoff, M., Frame, D., & Randalls, S. (2010). Discursive stability meets climate instability: A critical exploration of the concept of "climate stabilization" in contemporary climate policy. *Global Environmental Change*, *20*, 53064.

Braun, B. (2002). *The Intemperate Rainforest: Nature Culture and Power on Canada's West Coast*. Minneapolis: University of Minnesota Press.

Braun, B. (2008). Environmental issues: Inventive life. *Progress in Human Geography*, *32*, 667-679.

Bridges, K., & McClatchey, W. (2009). Living on the margin: Ethnoecological insights from Marshall Islanders at Rongelap atoll. *Global Environmental Change*, *19*(2), 140-146.

Brockhaus, M., & Kambire, H. (2009). Decentralisation: A window of opportunity for successful adaptation to climate change. In W. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to Climate Change: Thresholds, Values, Governance* (pp. 399-416). Cambridge: Cambridge University Press.

Bulkeley, H. (2001). Governing climate change: The politics of risk society. *Transactions of the Institute of British Geographers*, *26*, 430-447.

Bulkeley, H. (2005). Reconfiguring environmental governance: Towards a politics of scales and networks. *Political Geography*, *24*, 875-902.

Bumpus, A., & Liverman, D. (2008). Accumulation by decarbonisation and the governance of carbon offsets. *Economic Geography*, *84*(2), 127-155.

Burawoy, M. (2009). *The Extended Case Method*. Berkeley and Los Angeles, California: University of California Press.

Burnett, G. (2002). Technologies and discourses of colonialism in education in the Republic of Kiribati. *Directions: Journal of Educational Studies*, *24*(2), 10-23.

Burnett, G. (2005). Language games and schooling: Discourses of colonialism in Kiribati education. *Asia Pacific Journal of Education*, *25*(1), 93-106.

Buys, P., Deichmann, U., That, T., & Wheeler, D. (2009). Country stakes in climate change negotiations: Two dimensions of vulnerability. *Climate Policy*, *9*, 288-305.

Caliskan, K., & Callon, M. (2009). Economization, part 1: Shifting attention from the economy towards processes of economization. *Economy and Society*, *38*(3), 369-398.

Caliskan, K., & Callon, M. (2010). Economization, part 2: a research programme for the study of markets. *Economy and Society*, *39*(1), 1-32.

Callon, M. (1998). The embeddedness of economic markets in economics. In M. Callon (Ed.), *Laws of the Markets* (1st ed., pp. 1-57). Oxford and Malden, MA: Wiley-Blackwell.

Callon, M., & Law, J. (1995). Agency and the hybrid collectif. *The South Atlantic Quarterly*, *94*(2), 481-506.

Cannon, T., & Muller-Mahn, D. (2010). Vulnerability, resilience and development discourses in the context of climate change. *Natural Hazards*, *55*(3), 621-635.

CDIAC. (2008). Fossil-fuel CO2 Emissions`. *Carbon Dioxide Information Analysis Center*. Retrieved from http://cdiac.ornl.gov/

Chapman, P. (2010, June 3). Pacific islands "growing not shrinking" due to climate change. *The Telegraph*. London. Retrieved from http://www.telegraph.co.uk/news/worldnews/australiaandthepacific/tuvalu/7799503/Pacific-islands-growing-not-shrinking-due-to-climate-change.html

Clark, N. (2007). Living through the tsunami: Vulnerability and generosity on a volatile earth. *Geoforum*, *38*, 1127-1139.

Crouch, D. (2003). Performances and constitutions of nature: A consideration of the performances of lay geographies. In B. Szerszynski, W. Heim, & C. Waterton (Eds.),

Nature Performed: Environment, Culture and Performance (pp. 17-30). Oxford, UK and Malden, MA: Blackwell Publisher.

Cutter, S. (2003). The vulnerability of science and the science of vulnerability. *Annals of the Association of American Geographers*, *93*(1), 1-12.

Dasgupta, S., Laplante, B., Meisner, C., Wheeler, D., & Yan, J. (2009). The impact of sea level rise on developing countries: a comparative analysis. *Climatic Change*, *93*(3-4), 379-388.

Donner, S. (2009). Coping with commitment: Projected thermal stress on coral reefs under different future scenarios. *PLoS-One*, *4*(6), e5712.

Dovers, S. (2009). Normalizing adaptation. *Global Environmental Change*, *19*, 4-6.

East, A., & Dawes, L. (2009). Homegardening as a panacea: A case study of South Tarawa. *Asia Pacific Viewpoint*, *50*(3), 338-352.

Elrick, C., & Kay, R. (2009). *Mainstreaming of an Integrated Climate Change Adaptation Based Risk Diagnosis and Response Process into Government of Kiribati: Final Report* (Report prepared for the KAP Project, Phase II). Perth: Coastal Zone Management.

Fankhauser, S., Smith, J., & Tol, R. (1999). Weathering climate change: Some simple rules to guide adaptation decisions. *Ecological Economics*, *30*, 67-78.

Farbotko, C. (2005). Tuvalu and Climate Change: Constructions of Environmental Displacement in The *Sydney Morning Herald*. *Geografiska Annaler: Geografiska Series B, Human Geography Geogra*, *87*(4), 279-293.

Ferguson, J. (1994). *The Anti-Politics Machine: "Development", Depolitization and Bureaucratic Power in Lesotho*. Minneapolis: University of Minnesota Press.

Findlay, A. (2005). Vulnerabile spatialities. *Population, Space and Place*, *11*(6), 429-439.

Fussel, H. (2007). Vulnerability: A generally applicable conceptual framework for climate change research. *Global Environmental Change*, *11*(6), 155-167.

Fussel, H., & Klein, R. (2006). Climate change vulnerability assessments: An evolution of conceptual thinking. *Climatic Change*, *75*, 301-329.

Galvin, N. (2007, April 14). Tide Turning for Paradise. *The Age*. Retrieved from http://www.theage.com.au/news/in-depth/tide-turning-for-paradise/2007/04/13/1175971346790.html?page=fullpage

GEF. (2005). *Project Executive Summary* (GEF Council Submission No. 36846). Washington DC: GEF.

GEF. (2009). *Project Paper - Kiribati Adaptation Project* (Project Paper). Washington DC: GEF.

Goldman, M. (2005). *Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization*. New Haven and London: Yale University Press.

Government of Kiribati. (2005). *Kiribati Climate Change Adaptation Strategy*. Tarawa: Government of Kiribati.

Government of Kiribati. (2009, December 9). Kiribati runs very successful side event at COP15 in Copenhagen. *Climate change in Kiribati: The climate change portal of the Office of the President of Kiribati*. Retrieved from http://www.climate.gov.ki/news/20091209_COP15SideEvent.html

Government of Kiribati. (2010a). Components. *Kiribati Adaptation Project - Phase 1*. Retrieved from http://www.kap.gov.ki/index.php?option=com_content&view=article&id=46&Itemid=54

Government of Kiribati. (2010b, August 10). New shoreline protection guidelines for Kiribati. *Climate change in Kiribati: The climate change portal of the Office of the President of Kiribati*. Retrieved from http://www.climate.gov.ki/news/20100810_KAPII.html

Government of Kiribati. (2010c). The human face of climate change. *Climate change in Kiribati: The climate change portal of the Office of the President of Kiribati*. Retrieved from http://www.climate.gov.ki/Climate_change_effects_in_Kiribati.html

Green, T., Taniguchi, M., & Kooi, H. (2007). Potential impacts of climate change and human activity on subsurface water resources. *Vadose Zone Journal*, *6*, 531-532.

Gregson, N., & Rose, G. (2000). Taking Butler elsewhere: performativities, spatialities and subjectivities. *Environment and Planning D: Society and Space*, *18*, 433-452.

Grimble, A. (1956). *A Pattern of Islands*. London, UK: John Murray.

Grimble, A. (1957). *Return To The Islands*. London, UK: John Murray.

Grimble, A. (1989). *Tungaru Traditions: Writings on the Atoll Culture of the Gilbert Islands*. (H. Maude, Ed.). Honolulu: University of Hawai'i Press.

GWP Consultants. (2010a). *Tsunami Water Resources Impact Assessment* (Capability Statement No. W-002). Water Resources. Oxfordshire: GWP. Retrieved from http://www.gwp.uk.com/waterpp.htm

GWP Consultants. (2010b). *Island Freshwater Lens Investigations in Niue* (Capability Statement No. W-001). Water Resources. Oxfordshire: GWP. Retrieved from http://www.gwp.uk.com/waterpp.htm

Hardie, I., & MacKenzie, D. (2006). Assembling an economic actor: The agencement of a hedge fund. Presented at the New Actors in a Financialised Economy and Implications for Varieties of Capitalism, Institute of Commonwealh Studies, London.

Harris, L. (2008). Modernizing the nation: Postcolonialism, postdevelopmentalism, and ambivalent spaces of difference in southeastern Turkey. *Geoforum*, *39*, 1698-1708.

Harrison, P. (2008). Corporeal remains: Vulnerability, proximity, and living on adter the end of the world. *Environment and Planning A*, *40*, 423-455.

Head, L. (2010). Cultural ecology: Adaptation - retrofitting a concept? *Progress in Human Geography*, *34*(2), 234-242.

Heltberg, R., Siegel, P., & Jorgensen, S. (2009). Addressing human vulnerability to climate change: Towards a "no-regrets" approach. *Global Environmental Change*, *19*, 89-99.

Heynen, N., McCarthy, J., Prudham, S., & Robbins, P. (2007). Introduction: False promises. In N. Heynen, J. McCarthy, S. Prudham, & P. Robbins (Eds.), *Neoliberal Environments: False Promises and Unnatural Consequences* (pp. 1-21). London and New York: Routledge.

Hinchliffe, S., Kearnes, M., Degen, M., & Whatmore, S. (2005). Urban wild things: A cosmopolitical experiment. *Environment and Planning D: Society and Space*, *23*, 643-658.

Horton, D. (2003). Green distinctions: The performance of identity among environmental activists. In B. Szerszynski, W. Heim, & C. Waterton (Eds.), *Nature Performed: Environment, Culture and Performance* (pp. 63-77). Oxford, UK and Malden, MA: Blackwell Publisher.

Hulme, M. (2008a). Geographical work at the boundaries of climate change. *Transactions of the Institute of British Geographers*, *33*(1), 5-11.

Hulme, M. (2008b). Governing and adapting to climate. A response to Ian Bailey's Commentary on "Geographical work at the boundaries of cliamt change." *Transactions of the Institute of British Geographers*, *33*, 424-427.

Hulme, M. (2008c). The conquering of climate: discourses of fear and their dissolution. *The Geographical Journal*, *174*(1), 5-16.

Huq, S., & Reid, H. (2004). Mainstreaming adaptation in development. *IDS Bulletin*, *35*(5), 15-21.

IPCC. (2007a). Summary for Policymakers. In M. Parry, O. Canziani, J. Palutikof, P. van der Linden, & Hanson (Eds.), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 7-22). Cambridge, UK: Cambridge University Press.

IPCC. (2007b). *Climate Change 2007: The Physical Science Basis*. New York: Cambridge University Press.

Japan International Cooperation Agency. (2009). *JICA Profile* (JICA Profile). Tokyo: JICA.

Jerneck, A., & Olsson, L. (2008). Adaptation and the poor: Development, resilience and transition. *Climate Policy*, *8*, 170-182.

Kay, R. (2009). Sea Level Rise Inundation Risk. *Kiribati: Our Road to Copenhagen*. Presented at the UN Climate Change Conference, Copenhagen.

Kiribati Statistics Office. (2007). *Kiribati 2005 Census. Volume 2: Analytical Report* (pp. 1-143). Tarawa: Government of Kiribati.

Klein, R., & Mohner, A. (2009). Governance limits to effective global financial support for adaptation. In W. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to Climate*

Change: Thresholds, Values, Governance (pp. 465-475). Cambridge: Cambridge University Press.

Kok, M., Metz, B., Verhagen, J., & van Rooijen, S. (2008). Integrating development and climate policies: National and international benefits. *Climate Policy*, *8*(2), 103-118.

Lal, M., Harasawa, H., & Takahashi, K. (2002). Future climate change and its impacts over small island states. *Climate Research*, *19*, 179-192.

Larner, W., & Laurie, N. (2010). Travelling technocrats, embodied knowledges: Globalizing privatization in telecoms and water. *Geoforum*, *41*, 218-226.

Liverman, D. (2008). Conventions of climate change: constructions of danger and the dispossession of the atmosphere. *Journal of Historical Geography*, *3*, 279-296.

Macdonald, B. (1982). *Cinderellas of the Empire*. Canberra: Australian National University Press.

Mace, M. (2006). Adaptation under the UN Framework Convention on Climate Change: The international legal framework. In W. Adger, J. Paavola, S. Huq, & M. Mace (Eds.), *Fairness in adaptation to climate change* (pp. 53-76). Cambridge, Mass. ; London :: MIT.

MacKenzie, D. (2006). *An Engine, Not a Camera: How Financial Models Shape Markets*. Cambridge, Mass: MIT Press.

MacKenzie, DA. (2007). Is economics performative?: Option theory and the construction of derivatives marekt. In DA MacKenzie, F Muniesa, & L Siu (Eds.), *Do Economists Make Markets?: On the Performativity of Economics*. Princeton: Princeton University Press.

MacKenzie, DA, Muniesa, F, & Siu, L (Eds.). (2007). *Do Economists Make Markets?: On the Performativity of Economics*. Princeton: Princeton University Press.

Mansfield, B. (2004). Neoliberalism in the oceans: "Rationalization," property rights, and the commons question. *Geoforum*, *35*, 313-326.

Marks, K. (2008, June 6). Paradise lost: Climate change forces South Sea islanders to seek sanctuary abroad. *The Independent*. L.

Martello, M., & Jasanoff, S. (2004). Introduction: Globalization and environmental governance. In S. Jasanoff & M. Martello (Eds.), *Earthly Politics: Local and Global in Environmental Governance* (pp. 1-29). Cambridge, Mass: The MIT Press.

McCarthy, J. (2007). Privatizing the conditions of production: Trade agreements as neoliberal environmental governance. In N. Heynen, J. McCarthy, S. Prudham, & P. Robbins (Eds.), *Neoliberal Environments: False Promises and Unnatural Consequences* (pp. 38-50). London and New York: Routledge.

McDonald, P. (2010, June 3). Pacific islands growing, not sinking. *ABC Science*. item, . Retrieved from http://www.abc.net.au/science/articles/2010/06/03/2916981.htm

McDonald-Gibson, C. (2007, December 6). That's the sound of cultures drowning. *The Daily Telegraph*. Australia.

McDowell, L., & Court, G. (1994). Performing work: bodily representations in merchant banks. *Environment and Planning D: Society and Space*, *12*(6), 727 – 750.

Metz, B., & Kok, M. (2008). Integrating development and climate policies. *Climate Policy*, *8*, 9-102.

Mimura, N., Nurse, L., McLean, R., Agard, J., Briguglio, L., Lefale, P., Payet, R., et al. (2007). Small Islands. In M. Parry, O. Canziani, J. Palutikof, P. van der Linder, & C. Hansen (Eds.), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of*

Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 687-716). Cambridge: Cambridge University Press.

Mitchell, T. (2002). *Rule of Experts: Egyt, Techno-Politics, Modernity*. Berkeley, Los Angeles, London: University of California Press.

Mitchell, T. (2007). The properties of markets. In D. A. MacKenzie, Fabian Muniesa, & Lucia Siu (Eds.), *Do Economists Make Markets?: On the Performativity of Economics* (pp. 244-275). Princeton: Princeton University Press.

Mitchell, T. (2009). How neoliberalism makes its world: The urban property rights project in Peru. In P. Mirowski & Plehwe (Eds.), *The Road from Mont Pellerin: The Making of the Neoliberal Thought Collective*. Cambridge, London: Harvard University Press.

Morton, A. (2009, November 21). In Kiribati, a way of life is being washed away. *The Age*. Melbourne. Retrieved from http://www.theage.com.au/world/in-kiribati-a-way-of-life-is-being-washed-away-20091120-iqy7.html

Mosse, D. (2005). *Cultivating Development: An Ethnography of Aid Policy and Practice*. London and Ann Arbor: Pluto Press.

Nash, C. (2000). Performativity in practice: Some recent work in cultural geography. *Progress in Human Geography*, *24*, 653-664.

National Economic Planning Office. (2009). *Kiribati Government 2010 Budget*. Tarawa, Kiribati: Ministry of Finance and Economic Development.

Nicholls, R. J., & Cazenave, A. (2010). Sea-Level Rise and Its Impact on Coastal Zones. *Science*, *328*(5985), 1517 -1520.

Nicholls, R. J., Marinova, N., Lowe, J. A., Brown, S., Vellinga, P., de Gusmão, D., Hinkel, J., et al. (2011). Sea-level rise and its possible impacts given a “beyond 4°C world” in the

twenty-first century. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, *369*(1934), 161 -181.

Nicholson-Cole, S., & O'Riordan, I. (2009). Adaptive governance for a changing coastline: Science, policy and public in search of a sustainable future. In W. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to Climate Change: Thresholds, Values, Governance* (pp. 368-383). Cambridge: Cambridge University Press.

Noy, D. (2009). When Framing Fails: Ideas, Influence, and Resources in San Francisco's Homeless Policy Field. *Social Problems*, *56*(2), 223-242.

NTNK Video, & Government of Kiribati. (2009, December 9). COP15 Kiribati side event. Song of the Frigate Te Itei. *YouTube*. Retrieved from http://www.youtube.com/watch?v=G5wEgGZhXrw&feature=related

NZAID. (2009, November 27). Kiribati/New Zealand Forward Aid Programme. NZAID.

O'Brien, J., Eriksen, S., Nygaard, L., & Schjolden, A. (2007). Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy*, *7*(1), 73-88.

O'Brien, K., Eriksen, S., Sygna, L., & Naess, L. (2006). Questioning complacency: climate change impacts, vulnerability, and adaptation in Norway. *Ambio*, *35*(2), 50-56.

Oreskes, N., Staniforth, D., & Smith, L. (2010). Adaptation to global warming: Do climate models tell us what we need to know. *Philosophy of Science*, *77*(5), 1012-1128.

Peck, J. (1999). Editorial: Grey Geography? *Transactions of the Institute of British Geographers*, *24*(2), 131-135.

Peck, J., & Theodore, N. (2010a). Mobilizing policy: Models, methods and mutations. *Geoforum*, *41*, 169-174.

Peck, J., & Theodore, N. (2010b). Recombinant workfare, across the Americas: Transnationalizing "fast" social policy. *Geoforum*, *41*, 195-208.

Pfeffer, W., Harper, J., & O'Neel, S. (2008). Kinematic Constraints on Glacier Contributions to 21st-Century Sea-Level Rise. *Science*, *321*(5894), 1340 -1343.

Philo, C. (2005). The geographies that wound. *Population, Space and Place*, *11*, 441-454.

Pidgeon, N., Lorenzoni, I., & Poortinga, W. (2008). Climate change or nuclear power - No thanks! A quantitative study of public perceptions and risk framing in Britain. *Global Environmental Change*, *18*, 69-85.

Pielke, R., Prins, Q., Rayner, S., & Sarewitz, D. (2007). Climate change 2007: Lifting the taboo on adaptation. *Nature*, *445*(7128), 597-598.

Pretes, M., & Gibson, K. (2008). Openings in the body of "capitalism": Capital flows and diverse economic possibilities in Kiribati. *Asia Pacific Viewpoint*, *49*(3), 381-391.

Rahmstorf, S. (2007). A Semi-Empirical Approach to Projecting Future Sea-Level Rise. *Science*, *315*(5810), 368 -370.

Ramsay, D., Stephens, S., Gorman, R., Oldman, J., & Bell, R. (2008). *Kiribati Adaptation Programme. Phase II: Information for Climate Risk Management. Sea levels, waves, run-up and overtopping* (Client Report No. GOK08201). Hamilton, New Zealand: National Institute of Water and Atmospheric Research LTD.

Ravuvu, A. (1987). *The Fijian Ethos*. Suva, Fiji: Institute of Pacific Studies, University of South Pacific.

Ravuvu, A. (1988). *Development or Dependence. The Pattern of Change in a Fijian Village*. Suva, Fiji: Institute of Pacific Studies, University of South Pacific.

Reed, B. (2010a, November 9). Kiribati dispatch: Out here climate change is a matter of national survival. *The Two-Way*. Retrieved from http://www.npr.org/templates/archives/archive.php?thingId=131216964

Reed, B. (2010b, November 10). On island of Kiribati, at-risk nations sign climate declaration. *The Two-Way*. Retrieved from http://www.npr.org/templates/archives/archive.php?thingId=131216964

Reed, B. (2010c, December 1). A Kiribati village slowly succumbs to the sea around it. *The Two-Way*. Retrieved from http://www.npr.org/blogs/thetwo-way/2010/12/01/131708517/a-kiribati-village-slowly-succumbs-to-the-sea-around-it?print=1

Richmond, B. (1993). *Reconnaissance geology of the Gilbert Group, Western Kiribati* (No. 77). Technical Report (pp. 1-65). Fiji: SOPAC.

Robbins, P., & Luginbuhl, A. (2007). The last enclosure. In N. Heynen, J. McCarthy, S. Prudham, & P. Robbins (Eds.), *Neoliberal Environments: False Promises and Unnatural Consequences* (pp. 25-37). London and New York: Routledge.

Roberts, S., Wright, S., & O'Neill, P. (2007). Good governance in the Pacific? Ambivalence and possibility. *Geoforum*, *38*, 967-984.

Robertson, M. (2000). No net loss: Wetland restoration and the incomplete capitalization of nature. *Antipode*, *32*(4), 463-493.

Robertson, M. (2004). The neoliberlization of ecosystem services: Wetland mitigation banking and problems of environmental governance. *Geoforum*, *35*, 361-373.

Roy, A. (2010). *Poverty Capital: Microfinance and the Making of Development*. New York and London: Routledge.

Schipper, E. (2007). *Climate Change Adaptation and Development: Exploring the Linkages* (Working Paper No. 107). Norwich: Tyndall Centre for Climate Change Research.

Schoenberger, E. (2007). Politics and practice: Becoming a geographer. In A. Tickell, E. Sheppard, J. Peck, & T. Barnes (Eds.), *Politics and Practice in Economic Geography* (pp. 27-37). Los Angeles, London, New Delhi and Singapore: Sage Publications Ltd.

Scott, J. (1998). *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, Connecticut: Yale University Press.

Scripps. (2011). Scripps CO2 Program. *Scripps Institution of Oceanography*. Retrieved from http://scrippsco2.ucsd.edu/home/index.php

Sheppard, E., & Leitner, H. (2010). Quo vadis neoliberalism? The remaking of global capitalist governance after the Washington Consensus. *Geoforum*, *41*(2), 185-194.

Simmons, P. (2003). Performing safety in faulty environments. In B. Szerszynski, W. Heim, & C. Waterton (Eds.), *Nature Performed: Environment, Culture and Performance* (pp. 78-93). Oxford, UK and Malden, MA: Blackwell Publisher.

Simpson, A., & Grosclaude, M. (2009). *Reducing the Risk of Disasters and Climate Variability in the Pacific Islands* (Republic of Kiribati Country Assessment). Washington: GFDRR, The World Bank, SOPAC.

Smit, B., & Pilifosova, O. (2003). From adaptation to adaptive capacity and vulnerability reduction. In J. Smith, R. Klein, & S. Huq (Eds.), *Climate Change, Adaptive Capacity and Development*. London: Imperial College Press.

Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, *16*, 282-292.

Storey, D., & Hunter, S. (2010). Kiribati: An environmental "perfect storm." *Australian Geographer*, *41*(2), 167-181.

Swyngedouw, E. (1999). Modernity and hybridity: Nature, Regeneracionismo, and the production of the Spanish waterscape. *Annals of the Association of American Geographers*, *89*(3), 443-465.

Swyngedouw, E. (2005). Dispossessing H2O: The contested terrain of water privatisation. *Capitalism Nature Socialismg*, *16*(1), 81-98.

Swyngedouw, E. (2010). Apocalypse forever? Post-political populism and the spectre of climate change. *Theory, Culture and Society*, *27*(2-3), 213-232.

Szerszynzki, B., Heim, W., & Waterton, C. (2003). Introduction. In B. Szerszynski, W. Heim, & C. Waterton (Eds.), *Nature Performed: Environment, Culture and Performance* (pp. 1-14). Oxford, UK and Malden, MA: Blackwell Publisher.

The World Bank. (2000). *Cities, Seas and Storms: Managing change in Pacific Island Economies* (No. IV). World Bank Country Study Reports (pp. 1-18). Washington DC: Papua New Guinea and Pacific Islands Country Unit, The World Bank.

The World Bank. (2010a). *The World Bank Annual Report 2010: Year in Review*. Washington DC: The World Bank.

The World Bank. (2010b). *Development and Climate Change*. World Development Report (pp. 1-411). Washington DC: IBRD/The World Bank.

The World Bank. (2011). *Country Assistance Strategy for the Republic of Kiribati FY 2011-2014* (Country Assistance Strategy No. 59355-KI). Washington DC: The World Bank, International Development Association, International Financial Corporation.

Thomas, F. (2003). Kiribati: "Some aspects of human ecology," forty years later. *Atoll Research Bulletin*, *501*, 1-40.

Thompson, C., Mullan, B., & Burgess, R. (2008). *Kiribati Adaptation Programme. Phase II: Information for Climate Risk Management. High intensity rainfall and drought* (Client Report No. GOK08201). Hamilton, New Zealand: National Institute of Water and Atmospheric Research LTD.

Tiroa, T. (2006). *Analytical Report on the 2006 Kiribati Household Income and Expenditure Survey*. Tarawa, Kiribati: National Statistics Office.

Tol, RSJ. (2005). Adaptation and mitigation: Trade-offs in substance and methods. *Environmental Science and Policy*, *8*, 572-578.

Tompkins, E. (2005). Planning for climate change in small islands: Insights from national hurricane preparedness in the Cayman Islands. *Global Environmental Change*, *15*(2), 139-149.

Tompkins, E., Adger, W., Boyd, E., Nicholson-Cole, S., Weatherhead, K., & Arnell, N. (2010). Observed adaptation to climate change: UK evidence of transition to a well-adapting society. *Global Environmental Change*, *20*, 627-635.

Troost, J. (2004). *Sex Lives of Cannibals* (First Edition.). New York: Doubleday.

Tschakert, P. (2007). View from the vulnerable: Understanding climatic and other stressors in the Sahel. *Global Environmental Change*, *17*, 381-396.

UNFCCC. (2010). Tranistional Committee for the design of the Green Climate Fund. *UNFCCC*. Retrieved from http://unfccc.int/cooperation_and_support/financial_mechanism/green_climate_fund/items/5869.php

Watts, M., & Bohle, H. (1993). The space of vulnerability: the causal structure of hunger and famine. *Progress in Human Geography*, *17*(1), 43 -67.

Webb, A., & Kench, P. (2010). The dynamic response of reef islands to sea-level rise: Evidence from multi-decadal analysis of island change in the Central Pacific. *Global and Planetary Change*, *72*(3), 234-246.

Wilbanks, T., & Kates, R. (2010). Beyond adapting to climate change: Embedding adaptation responses to multiple threats and stresses. *Annals of the Association of American Geographers*, *100*(4), 719-728.

Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2003). *At Risk: Natural Hazards, People's Vulnerability and Disasters* (2nd ed.). London and New York: Routledge.

Woodroofe, C. (2008). Reef-island topography and the vulnerability of atolls to sea-level rise. *Global and Planetary Change*, *62*, 77-96.

Yamane, A. (2009). Climate change and hazardscape of Sri Lanka. *Environment and Planning A*, *41*(10), 2396-2416.

Yeung, H. (2007). Researching hybridity through "Chinese" business networks. In A. Tickell, E. Sheppard, J. Peck, & T. Barnes (Eds.), *Politics and Practice in Economic Geography* (pp. 279-289). Los Angeles, London, New Delhi and Singapore: Sage Publications Ltd.

Appendices

Appendix A: Table of interviews

Institution	Date	Place
Former World Bank	6 April 2010	Skype Interview
Former World Bank	12 April 2010	Skype Interview
KAP	5 May 2010	KAP Office
University of the South Pacific, Kiribati	6 May 2010	University of the South Pacific, Kiribati
KAP	7 May 2010	KAP Office
GWP	8 May 2010	Tabon Te Keeke Resort
The World Bank, Asian Development Bank, NZAid	9 May 2010	Mary's Hotel
Consultant to the World Bank	10 May 2010	Ministry of Public Works and Utilities
Ministry of Public Works and Utilities	10 May 2010	Ministry of Public Works and Utilities
KAP	10 May 2010	KAP Office
Office of the President	11 May 2010	Office of the President
Office of the President	11 May 2010	Office of the President
Consultant to the European Union and SOPAC	14 May 2010	Ministry of Fisheries and Marine Resources Development
Consultant to the World Bank	15 May 2010	Tabon Te Keeke Resort
GWP	15 May 2010	Tabon Te Keeke Resort
The World Bank	16 May 2010	Mary's Hotel
Australian High Commission	17 May 2010	Australian High Commission
Consultant to the World Bank	17 May 2010	KAP Office
Consultant to the European Union and SOPAC	18 May 2010	Ministry of Planning and Economic Development
Ministry of Planning and Economic Development	18 May 2010	Ministry of Planning and Economic Development
The World Bank	18 May 2010	Mary's Hotel
Butaritari Council	20 May 2010	Butaritari
Mayor's Office	20 May 2010	Butaritari
Household Interview	20 May 2010	Middle Village, Butaritari
Household Interview	20 May 2010	South Village, Butaritari
Household Interview	20 May 2010	South Village, Butaritari

Institution	Date	Place
Household Interview	20 May 2010	South Village, Butaritari
Butaritari Council	21 May 2010	Butaritari
Household Interview	21 May 2010	North Village, Butaritari
Household Interview	21 May 2010	North Village, Butaritari
Household Interview	21 May 2010	Middle Village, Butaritari
Household Interview	21 May 2010	Middle Village, Butaritari
Butaritari Council	22 May 2010	Butaritari
Meteorological Office	25 May 2010	Meteorological Office
Ministry of Public Works and Utilities	26 May 2010	Ministry of Public Works and Utilities
Consultant to the World Bank	26 May 2010	Ministry of Public Works and Utilities
Federation of the Peoples of the South Pacific. Kiribati	27 May 2010	Mary's Hotel
Kiribati Association of NGOs	27 May 2010	KANGO Office
NTNK	27 May 2010	NTNK Office
Ministry of Environment, Land and Agricultural Development	28 May 2010	Ministry of Environment, Land and Agricultural Development
UN Joint Office	28 May 2010	UN Joint Presence Office
The Pacific Region Infrastructure Facility	29 May 2010	Mary's Hotel
Boata Council	31 May 2010	Boata
Household Interview	31 May 2010	Boata
Household Interview	31 May 2010	Boata
Household Interview	31 May 2010	Boata
Ministry of Environment, Land and Agricultural Development	31 May 2010	Ministry of Environment, Land and Agricultural Development
Kiribati Catholic Church	1 June 2010	Catholic Church
Ministry of Foreign Affairs	1 June 2010	Ministry of Foreign Affairs
Ministry of Internal and Social Affairs	1 June 2010	Ministry of Internal and Social Affairs
Ministry of Finance	2 June 2010	Ministry of Finance
Public Utilities Board	2 June 2010	Public Utilities Board
Ministry of Health	3 June 2010	Ministry of Health
Mayor's Office	4 June 2010	Abemama
Mayor's Office	4 June 2010	Abemama

Institution	Date	Place
Household Interview	5 June 2010	North Village, Abemama
Household Interview	5 June 2010	North Village, Abemama
Household Interview	5 June 2010	North Village, Abemama
Household Interview	5 June 2010	South Village, Abemama
Household Interview	5 June 2010	South Village, Abemama
Japan International Cooperation Agency	7 June 2010	JICA Office
Taiwanese High Commission	7 June 2010	Taiwanese High Commission
Ministry of Public Works and Utilities	8 June 2010	Ministry of Public Works and Utilities
KAP	8 June 2010	KAP Office
NZAid	8 June 2010	NZAid Office
UN Joint Office	8 June 2010	UN Joint Presence Office
Consultant to NZAid	9 June 2010	Ministry of Internal and Social Affairs

Appendix B: Information document

Analysis and history of the Kiribati Adaptation Project

This research project involves a multi-method study of the Kiribati Adaptation Project (KAP). It will evaluate the novel family of climate change adaptation projects that have been introduced in this environmentally sensitive region in recent years, including those supported by the World Bank and the Global Environment Facility. In particular, I am interested in the history of policy-making in this area, the challenges that policy-makers faced in developing new programs for Kiribati and the lessons learned from their roll-out 'on the ground'. I am also investigating how, in a practical sense, decisions are made and implemented in the KAP and what role evaluation science has played in these processes. My research focuses on the freshwater resources and coastal management and planning components on the KAP. This study is funded by the Hampton Research Fund at the University of British Columbia.

In addition to analyzing secondary data, my approach involves talking to community leaders, government officials, scientists and consultants about implementation and decision making in the KAP. I will explore a range of experiences of the KAP and how these outcomes were achieved in order to explore the most effective strategies for implementing climate change adaptation projects in the Pacific Island Countries.

- Given that it was a novel and innovative project for multilateral agencies, what experience and information was drawn upon when KAP was designed?
- What does successful climate change adaptation look like in countries such as Kiribati? How should success be measured in projects like KAP?
- How have relationships between the Government of the Republic of Kiribati and multilateral agency personnel developed? How do diverse stakeholders, including government, communities and churches contribute to project design and implementation?
- What roles have the private sector played in the KAP and other climate change adaptation projects? How might this evolve in the future?
- What lessons have been taken from KAP for other climate change adaptation projects implemented by the World Bank and Global Environment Facility?

The research is being undertaken by Sophie Webber, who is currently completing a Master of Arts in the Department of Geography at the University of British Columbia in Vancouver, Canada. The results of the investigation will form the basis of her thesis, which will be a contribution to the urgent debate around climate adaptation in Pacific Island Countries.