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IS CLIMATE CHANGE A NATIONAL SECURITY THREAT TO NEW ZEALAND?

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ABSTRACT

Climate change is a global matter that will have significantly different regional impacts around the globe. Although a great deal of scientific work has gone into understanding the impacts of climate change, more recently, professionals from other fields have begun to investigate how their particular field will be effected. The possible links between climate change and security threats has begun to receive more attention in recent years, and this paper looks at this possible link for New Zealand and its national security.

This paper takes a first principle approach of initially defining the problem of climate change. Considerable effort is given towards understanding the impacts of climate change from both a global perspective and from New Zealand's perspective, before looking at the security challenges that may arise.

The paper takes a closer look at the changing definitions of security, and explores the notion of what constitutes a 'threat'. Based on this discussion, and taking into account the likely impacts of climate change on New Zealand, the paper concludes that climate change does not pose a national security threat to New Zealand.

INTRODUCTION

In the last ten years, the climate change topic has become increasingly important on the world stage. It is often one of the key topics discussed at international meetings such as the UN General Assembly, the G8/G20 meetings, and APEC. Increasingly, governments across the developed world are issuing their plans to deal with climate change, and the international effort towards reaching a global agreement on mitigating climate change continues.

Given all this international focus, the literature on the topic of climate change is expanding exponentially every year, with numerous different views espoused from one extreme of the doomsayers to the other extreme of denial that it is happening. As is often the case the truth will lie somewhere in between, but exactly where is the great unknown. For when it comes to the impacts of climate change, it is very difficult to determine its exact effects across the globe. The climate is an incredibly complex system that even the world's greatest computer models struggle to give any form of certainty on, and therefore the top climate scientists can only give predictions and not certainties of what the impacts of climate change will be. This allows for a huge range of possibilities, and it is difficult to dismiss these offhand as it is possible that any one of them could be accurate.

The United Nations Intergovernmental Panel on Climate Change (IPCC) defines climate change as 'any change in climate over time, whether due to natural variability or as a result of human activity.'[1] Although the world's climate has naturally fluctuated significantly over the history of the earth, a more common understanding of climate change is the Framework Convention of Climate Change's definition, which is focused solely on the warming of the

[1] IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Groups II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson. (UK: Cambridge University Press, 2007), 6.

planet due to greenhouse gases (GHG) released into the atmosphere due to the activities of humankind (known as anthropogenic global warming (AGW).[2]

The impacts of climate change are unlikely to happen immediately, but instead will be long-term trends that will take place over decades and centuries. To a degree, this allows for time to adapt, but also, to a degree, takes away any urgency to address the matter. Even with planned mitigation strategies the world's average temperature will very likely increase close to 2°C at the least, which will have significant agricultural and political impacts in many parts of the world, but in particular in the sub tropic zones.[3] One of the few certain things about climate change is that different parts of the globe will be affected quite differently, and the likely areas to be hit the hardest are also some of the poorer regions of the world.

These overall uncertainties bring a huge number of variables and individual interests to the climate change debate, which in turn complicates climate change predictions. It is in the interest of some nations and global industries to state that humankind is having a very limited impact and so the world should wait and see what happens, whereas it is within the interest of other nations and certain organisations to say it is a significant problem that needs an immediate international mitigation strategy. Although no one is sure exactly how quickly climate change will take place, or how severe its impacts will be, many scientists increasingly believe that its global impacts (whatever they happen to be) will be worse than originally believed.[4]

Given all the interest in climate change, security professionals from both civil think tanks and militaries have started to put some focus onto the issue of climate change, to determine if it will become a future security threat. This matter has been complicated in recent years by the

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[2] IPCC, *Climate Change 2007: Impacts, Adaptation and Vulnerability…*, 6.

[3] Gwynne Dyer, *Climate Change and Security: Risks and Opportunities for Business*, (IISS: Lloyd's 360° Risk Insight, 2009), 14.

[4] *Ibid.*, 6.

constantly changing definition of security. So-called security issues now encompass a large variety of aspects from the ability of a state to ensure its national survival to the protection of the rights of an individual. When it comes to climate change, the reality is that every nation will be affected differently and therefore any global statement of whether climate change is or is not a security threat has limited usefulness.

Although New Zealand plays its part on the world stage, the reality is it is a very small, geographically isolated nation of four million citizens located in the Southern part of Pacific Ocean. There is over 2 000km of open ocean between it and the nearest large land mass of Australia. As a very small nation with limited resources, New Zealand is very reliant on international trade. New Zealand has a very limited defence budget and must take a very realistic view on future security needs. It maintains its status as a good 'international citizen' by regularly committing its Defence Force and other government departments to international stability matters, and through maintaining an active involvement with the United Nations.

New Zealand has accepted that climate change is happening and has been working with many other nations towards an international agreement on mitigating the effects of climate change, but New Zealand's role in mitigating the effects is very minor. Given these factors, and the international focus on the issue of climate change, it is appropriate to examine climate change's security impacts from a New Zealand perspective.

This paper will discuss whether climate change is a national security threat to New Zealand and will argue that although the impacts of climate change will potentially cause a number of significant concerns, these will not constitute a national security threat to New Zealand.

As the science of climate change impacts is still very imprecise, the best that can be given is possibilities, and whether they are likely, unlikely, or the worse case. This means that it

quickly becomes apparent that one must take a very balanced approach when looking at climate change, and not chase off down a "rabbit hole" with one possible factor. This in turn means that a balanced approach must be taken when considering whether climate change will be a national security threat to New Zealand. Therefore, for this paper a first principles approach has been adopted by initially defining the likely impacts of climate change and then analyzing whether these constitute a national security threat.

When researching the topic of climate change, it is apparent that most writers seem to have come from a particular field of study or profession and have then looked at climate change and how it relates to their particular field or profession. The result tends to be that the impacts of climate change tend to confirm whatever it was that they wanted it to confirm, and as there is so much uncertainty around climate change impacts it is difficult to prove them wrong. However, this is not useful when talking about threats to security, and in particular to national security. To either downplay or exaggerate a national security threat can be very costly in terms of both money and lives. Therefore, an honest and unbiased approach must be taken with the goal to ensure that an accurate assessment is made of any possible threats. This paper will attempt to provide that degree of assessment when looking at climate change.

Following a first principles approach, this paper will have three key chapters. The first chapter will discuss the global impact of climate change. As climate change is a global matter, it needs to be examined initially from a global perspective. The issues of taking global climate trends and distilling them down into regions and then countries is very imprecise and so an initial global look at climate change provides a solid grounding in the factors that are potentially facing the world in a climate changed tomorrow. The majority of the science of climate change for this chapter is taken from the United Nations International Panel on Climate Change Report from 2007 (IPCC 2007). As there are plenty of skeptics towards this report, some of the

skeptics' points of view are also noted. The impacts of climate change are broken down into primary impacts, and subsequent secondary impacts. Other than the primary impact of sea level rise, the majority of possible security concerns or threats will come from the secondary impacts of climate change. The secondary impacts include such factors as increased food and fresh water scarcity, mass migration, global economic slowdown, and conflict. As the overall effect of these secondary impacts generally rely on human responses, there lies a huge degree of uncertainty within them.

Chapter 2 discusses the impacts of climate change on New Zealand from both an internal and external perspective. Although it is considered difficult to establish exact regional impacts of climate change, some broad impacts can be determined. Most research indicates that, at least in the short to medium term, New Zealand will experience many positive benefits from climate change, including longer growing seasons for its agriculture sector and increased tourism due to an extended tourist season. However, some areas of the country will see negative effects as a result of increased drought conditions and rising storm surge levels. Due to New Zealand's geographic isolation, to a large degree it will be physically shielded from the areas likely to be hit the hardest by climate change. It is apparent that the secondary effects of climate change have the potential to cause security issues around the world, and, as a good international nation, it is likely that the New Zealand Government will chose to continue to get involved with nations in difficulty, regardless of the cause of that difficulty.

Chapter 3 examines 'what is a national security', 'what constitutes a threat', and subsequently assesses whether climate change is a national security threat to New Zealand. Initially the changing definitions of security are discussed, including the concept of human security. The concept of a 'threat' is examined using international relations theory as a tool to illustrate different interpretations of a threat. It quickly becomes apparent that although national

security should be a point of reference that potential threats can be assessed against, the reality is that there are now so many different ideas and possibilities of what constitutes a national security threat that its critical meaning has been obscured. This chapter will re-emphasize the traditional meaning of a national security threat in that the threat must threaten the survival of the state, or seriously threaten the standard of living of its inhabitants. Climate change does not meet these criteria for New Zealand in the short to medium term.

This paper will conclude that although climate change will potentially cause many issues for New Zealand and around the globe, climate change is not a national security threat to New Zealand. To a large degree, New Zealand is in a rather fortunate position when it comes to the impacts of climate change.

CHAPTER 1: WHAT IS CLIMATE CHANGE AND WHAT ARE ITS GLOBAL EFFECTS?

In the 1970s and 1980s, an increasing number of scientists became concerned that the industrialization of the globe would start having an effect on the global climate.[5] In 1988, the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP) jointly established the Intergovernmental Panel on Climate Change (IPCC). [6] Its mandate was to "assess the scientific information related to climate change, to evaluate the environment and socio-economic consequences of climate change, and to formulate realistic response strategies."[7] The IPCC has produced four reports: 1990, 1995, 2001, and 2007. [8] With each successive report, the science of climate change has been refined, and the global acceptance that climate change is happening has increased. To put this into context, eleven of the twelve years between 1995 to 2006 were among the twelve warmest years since instrumental records of global surface temperature have been kept (since 1850). [9] However, there are still significant uncertainties involved with the impacts of climate change due to the massively complex systems that make up the global climate.

In this chapter, climate change and its likely global impacts will be briefly discussed to lay the foundation for Chapter 2's discussion on the impacts of climate change on New Zealand.

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[5] Laura Jones, *Global Warming: The Science and the Politics*, (Canada: The Fraser Institute, 1997), 5.

[6] *Ibid.,* 5.

[7] IPCC, 2007, *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* ed. R.K. Pachauri, and A. Resinger, (Switzerland: IPCC, 2007), iii.

[8] *Ibid.,* iii.

[9] *Ibid.,* 2.

The chapter will be broken down into four main parts. The first part determines the causes of climate change, the second part determines the likely global primary and secondary impacts of climate change, the third part discusses mitigation and adaptation options and problems, and the final part discusses the arguments of the climate change sceptics. This chapter will conclude that climate change is happening, and although the exact effects are uncertain, there will be global effects that New Zealand must take into account when considering its future security concerns.

CAUSES OF CLIMATE CHANGE

The global climate can be affected through changes in atmospheric concentrations of greenhouse gases (GHGs) and aerosols, solar radiation levels, and ice and land coverage, which can all alter the energy balance of the climate system.[10] The common understanding of climate change is primarily concerned with the warming of the planet due to greenhouse gases (GHG) released into the atmosphere due to the activities of humankind (anthropogenic global warming (AGW)).

Since the industrial revolution, humankind has become increasingly reliant on fossil fuels (coal, oil, and natural gas) to provide energy. As a consequence, global GHG emissions have continued to grow exponentially since pre-industrial times. As an example, between 1970 and 2004 there was a 70% increase in GHG emissions and this rate continues to grow.[11]

The IPCC 2007 Report identifies that atmospheric concentrations of two of the leading GHG (CO2 at 379ppm and CH4 at 1774ppb) in 2005 by far exceed the natural range of these

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[10] *Ibid.,* 5.

[11] *Ibid.,* 5.

gases over the last 650,000 years. [12] The report identifies that global increases in CO2 concentrations are primarily due to mankind's use of fossil fuels, with changes in land-use (deforestation and intensive farming) providing another significant but smaller contribution.[13] Overall, the report states that, "there is very high confidence that the net effect of human activities since 1750 has been one of warming."[14]

PRIMARY GLOBAL IMPACTS

The global climate system has warmed 0.74°C over the past 100 years, and is expected to rise by between 2°C and 6°C over the next 100 years. [15] Although the lower end of the scale is far more likely, the upper end cannot be completely disregarded. The warming to date (and highly likely to continue into the future) has primarily occurred over the large landmasses and in the high northern latitudes, with the least warming in the Southern Ocean. This warming is starting to have a number of primary impacts: the melting of the polar ice caps, glaciers, and permafrost; rising sea level; changed weather patterns; increased ocean acidification caused by the higher atmospheric CO2 concentrations, and the possible reaching of a 'climate tipping point.'

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[12] *Ibid.,* 5.

[13] *Ibid.,* 5.

[14] *Ibid.,* 5.

[15] *Ibid.,* 2.

Melting of the Polar Ice Caps, Glaciers, and Permafrost

Mountain glaciers and snow cover on average has declined in both hemispheres. Within Asia, over a billion people rely on the snow and glacial feed rivers for their water needs. A significant reduction in these river flows will have a significant human impact in these areas.

In the Artic, since 1978 sea ice has shrunk by 2.7% per decade. [16] Additionally, the permafrost has been melting in the higher northern latitudes causing ground instability issues. This is beginning to have an effect on the human settlements living within these regions, and is increasing ground erosion along watercourses. [17] Additionally, and potentially far more catastrophic, is that the permafrost currently traps a vast amount of carbon (estimated 900 gigatonnes), and as the permafrost melts this carbon will be released into the atmosphere at a rate far in excess of current human GHG emission rates.[18]

Rising Sea Level

Global sea level has risen since 1961 at an average rate of 1.8 mm/yr and since 1993 at 3.1 mm/yr.[19] This has been caused by a combination of the thermal expansion of the oceans, melting glaciers, and the melting of the land-based polar ice sheets. Large-scale sea level rise (4-

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[16] *Ibid.,* 2.

[17] S.H. Schneider, S. Semenov, A. Patwardhan, I.Burton, C.H.D. Magadza, M. Oppenheimer, A.B. Pittock, A. Rahman, J.B. Smith, A. Suarez and F. Yamin, "Assessing Key Vulnerabilities and the Risk from Climate Change," *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* ed. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, (U.K: Cambridge University Press, 2007), 791.

[18] Gabrielle Walker, and Sir David King, *The Hot Topic: How to tackle global warming and still keep the lights on,* (United Kingdom: Bloomsbury, 2008), 81.

[19] IPCC, 2007, *Climate Change 2007: Synthesis Report…,* 2.

7 meters) resulting from the partial loss of land based ice sheets is projected to occur over a millennial timescale, but it could occur in centuries.[20] Even if successful mitigation strategies come into effect, sea level rise has gained substantial inertia and will continue for many centuries.[21] Half of the global population lives in coastal areas, and the rising sea will affect the long-term survivability of many of the lowest lying communities.[22]

Changed Weather Patterns

The amount of precipitation has generally increased in the higher latitudes and decreased in the low to mid-latitude areas of both hemispheres.[23] Effectively, those areas that already get high rainfall will become wetter, and those already dry areas will become dryer. Since the 1970s, tropical cyclones in the North Atlantic have been increasing in intensity, but there is no evidence of an increase in the numbers of cyclones.[24] Overall, across the globe it is very likely that all regions will experience an increase in the frequency of heat waves and heavy precipitation.[25]

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[20] IPCC, 2007, *Climate Change 2007: Synthesis Report…,* 13.

[21] R.J. Nicholls, P.P. Wong, V.R. Burkett, J.O. Codignotto, J.E. Hay, R.F. McLean, S. Ragoonaden and C.D. Woodroffe, "Costal Systems and Low-lying Areas," *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* ed. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, (U.K: Cambridge University Press, 2007), 317.

[22] Walker, Gabrielle, and Sir David King, *The Hot Topic...,* 57.

[23] IPCC, 2007, *Climate Change 2007: Synthesis Report...,* 2.

[24] *Ibid.,* 2.

[25] *Ibid.,* 8.

Increased Ocean Acidification

The increase in ocean acidification is due to the increased levels of CO2 in the atmosphere. Since 1750, the ocean has become slightly more acidic with further increases in atmospheric CO2 concentrations likely leading to further acidification. [26] Although not yet documented, it is expected that increasing acidification of the oceans will have negative impacts on marine shell-forming organisms (e.g. corals) and their dependent species.[27]

Climate Tipping Points

A climate tipping point is when the climate changes massively and abruptly. Climate tipping points include scenarios such as a shutdown of the oceans circulation, massive abrupt sea level rise due to the melting of Greenland and Antarctica's ice sheets, and the rapid melting of the Artic permafrost.[28] Climate tipping points are the worst-case scenario when it comes to the impacts of climate change.

Peter Schwartz and Doug Randall from the Global Business Network wrote a paper in 2003 for the US Department of Defence. In this paper, they explored the impacts of one of these worst-case scenarios, namely the slowing or stopping of the ocean's thermohaline conveyor, and its flow on effects on United States security. [29] Although they acknowledged that such an event was unlikely to happen, it did raise a number of possible global challenges such as the impact of

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[26] *Ibid.,* 9.

[27] *Ibid.,* 9.

[28] Walker, Gabrielle, and Sir David King, *The Hot Topic…,* 72-83.

[29] Peter Schwartz, and Doug Randall, *An Abrupt Climate Change and Its Implications for United States National Security,* http://www.gbn.com/consulting/article_details.php?id=53, Accessed: 23 January, 2010.

reduced human carrying capacity of regions, significant global food production decreases, decreased availability of fresh water, and disrupted access to energy supplies.[30] Within their scenario, the combined effect of these would lead to massive resource competition amongst nations resulting in regional conflicts and a global change in the balance of power. It is from such worst-case scenarios that many of the security concerns about climate change have emerged. It is important to realise and acknowledge that these are the unlikely worse case scenarios, as opposed to the most likely scenario.

Although a climate tipping point event is considered unlikely, if one does happen it could completely change the global order. Therefore, although they are acknowledged as possible, this paper will not focus on them, but will instead maintain its focus on the likely primary impacts and the more possible secondary impacts of climate change.

In summary, the primary impacts of global warming - the melting of the polar ice caps, glaciers, and permafrost; rising sea level; changed weather patterns; and increased ocean acidification - will continue for centuries even if the current efforts to stabilize GHG concentrations are successful. This is because of the large time scales associated with climate systems, and therefore, the longer it takes to stabilize these GHG concentrations, the longer the primary impacts will be felt.[31]

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[30] *Ibid.*

[31] IPCC, 2007, *Climate Change 2007: Synthesis Report….,* 12.

SECONDARY GLOBAL IMPACTS

The primary impacts of climate change will cause possible secondary impacts in the geophysical, biological and socio-economic systems both across the globe and within certain regions.[32] Although the primary impacts of climate change will cause issues by themselves, it is the secondary impacts that will potentially cause the greatest social, political, economic, and security problems in the years ahead. The secondary impacts in the geophysical, biological, and socio-economic systems are very closely linked through flow-on effects and feedback loops. While the severity of these secondary impacts is currently uncertain, it is predicted that certain regions will be affected far greater than others. Although there are numerous possible secondary impacts of climate change, the following possible secondary impacts are discussed below as they demonstrate how conflict may come about.[33]

Food and Water Scarcity

Due to a combination of increasing temperatures and changing precipitation patterns, there is a concern that this will lead to food and water shortages in some of the more densely populated areas of the world. [34] As pointed out by Working Group II of the IPCC 2007 Report, changes in the precipitation and snowmelt patterns, including the possible loss of the monsoon

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[32] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 781.

[33] See also Ewan Sinclair, "The Changing Climate of New Zealand's Security: Risk and Resilience in a Climate Affected Environment;" Dupont, Alan, and Graeme Pearman, *Heating up the Planet: Climate Change and Security*; and Busby, Joshua W., "Who Cares About the Weather?: Climate Change and U.S. National Security," *Security Studies, 17: 3,* 468-504, for further examples and expansion of secondary impacts.

[34] Gabrielle Walker, and Sir David King, *The Hot Topic…,* 57.

rains, could affect approximately 1 billion people in South, South-East, and East Asia.[35] Global food production has only been increasing incrementally in recent years, and many of the cereal crops are at their upper temperature limit for germination.[36] Increases in regional temperatures above these germination limits will have an adverse effect on the harvesting capacity of those regions.

The Working Group II report states, "There is high confidence that climate change will result in extinction of many species and reduction in the diversity of ecosystems."[37] Due to the complexities of any natural food chain, a reduction in biodiversity could have significant flow on effects, including a decrease in food availability. As an example, corals are vulnerable to thermal stress and have low adaptive capacity.[38] Coral reefs are the breeding grounds for many of the marine species that form the bottom layers of the marine food chain. A significant loss of coral reefs could have a significant flow on effect to the marine eco-system, which in turn will affect human communities that are heavily reliant on fish as part of their staple diet.[39]

As the global population is expected to increase to around 9 billion people by the year 2050, the world's food resources are going to be stretched regardless of climate change.[40] Therefore, to blame all future food and water scarcity issues on climate change would be wrong. Nevertheless, climate change is likely to magnify many scarcity issues and create some scarcity issues by itself.

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[35] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 791.

[36] United Nations, *High Level Task Force on the Global Food Security Crisis: Progress Report April 2008 – October 2009*, http://www.un.org/issues/food/taskforce/pdf/COMPLETED%20UN%20HLTF%20PROGRESS%20REPORT%20April%2008%20to%20Oct%2009.pdf, Accessed: 09 April 2010.

[37] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 792.

[38] R.J. Nicholls, P.P. Wong, …, "Costal Systems and Low-lying Areas…, 317.

[39] Gabrielle Walker, and Sir David King, *The Hot Topic…*, 58.

[40] Gwynne Dyer, *Climate Change and Security…*, 26.

Mass Migration

When assessing climate change, it is the area of mass migration that causes many of the international concerns about climate change. The alarmists will say that climate change will bring about waves of 'environmental refugees' that will overwhelm other nations, whereas the sceptics will say that migration is a complex process and that no one factor will dominate an individuals decision to migrate.[41] Further complicating the matter is that no clear definition has yet been reached on what differentiates an environmental migrant from any other type of migrant, and whether such a distinction is necessary. There are ongoing international discussions on whether the UN definition of refugees should be expanded to include environmental migrants, or whether the current definition is suitable regardless of the impacts of climate change.[42]

Climate change has the potential to bring about migration due to a number of primary and secondary impacts. As a result of the previously discussed rising sea level and food and water scarcity issues reducing the carrying capacity of certain areas, there lies the potential for significant human migration as people move to an area with greater carrying capacity.[43] The changing precipitation patterns are also likely to result in an increase in desertification around

[41] Olivia Dun, and Francois Gemenne, "Defining 'environmental migration'" in *Forced Migration Review*, Issue 31, (October 2008), 11.

[42] Maria Stavropoulou, "Drowned in Definitions," in *Forced Migration Review*, Issue 31, (October 2008), 11.

[43] Abdel-Galil Elmekki, "Food Crisis: Their roots in a Country's Political and Development Crises," *Ecology, Politics & Violent Conflict,* ed. Mohamed Suliman, (New York: Zed Books, 1999), 240.

already established arid zones, placing more pressure on people in these areas to migrate.[44] The rising sea will not only result in the gradual loss of land through swamping and increased coastal erosion, but will also adversely affect fresh water availability in costal areas due to increased salinity.[45] Weather disasters caused by extreme storm activity in the tropical areas, including an increase in storm surge as a result of the rising sea level, will place further pressures on communities in these areas.[46] In combination, all these factors have the potential to cause migration.

The unknown factor is whether this migration will be internal migration or external migration, and over what time period this migration will occur. In the case of the Maldives – an island nation in the Indian Ocean that is highly likely to be completely submerged by the rising sea – the people must migrate externally. However, people in other nations may have the option to migrate internally. Those migrating because of extreme weather events or other natural disaster have often only temporary migrated, and will often return to their original place of residence when possible.

Whether people migrate internally or externally, temporarily of permanently, it will place considerable pressure on those communities already established in the area where the migrants may attempt to settle. If this migration occurs without effective domestic and international policies to manage it, it may in turn cause significant social and economic problems in the affected areas.

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[44] B.C. Bates, Z.W. Kundzewicz, S.Wu, and J.P. Palutikof, *Climate Change and Water: Technical Paper of the Intergovernmental Panel on Climate Change*, (Geneva: IPCC Secretariat, 2008), 20.

[45] R.J. Nicholls, P.P. Wong, …, "Costal Systems and Low-lying Areas…, 317.

[46] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 795.

Conflict

As mentioned when discussing climate-tipping points, these events are often theoretically linked with an increase in global insecurity and conflict. As such events are considered very unlikely in the short to medium term, this section will instead focus on the more likely links between climate change and conflict.

As opposed to being a source of conflict itself, climate change is more likely to exacerbate current underlying tensions within potential conflict areas. Climate change may be considered a potential catalysis to conflict. As an example, if there are ethnic tensions within a certain area, and then climate change causes food and water scarcity issues in that area, then tensions are likely to further rise, which may lead into conflict. However, this tension will only lead to a security crisis if the local government or the international community is unable to provide resolution to the tensions.[47]

Research indicates that when it comes to water scarcity, the much-hyped interstate water wars are unlikely. Possible water wars are only likely to eventuate in a very few areas of the globe, and even then only if diplomatic solutions fail.[48] When two or more nations share a water basin, this does provide a potential source of conflict, but military interstate disputes "are likely to be of low intensity and cooperation is a more likely outcome."[49]

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[47] Jef Huysmans, and Vicki Squire, "Migration and Security," in *The Routledge Handbook of Security Studies,* ed. Myriam Dunn Cavelty and Victor Mauer, (Canada: Routledge, 2010), 171.

[48] Gwynne Dyer, *Climate Change and Security…*, 21.

[49] Nils Petter Gleditsch, and Ole Magnus Theisen, "Resources, the Environment and Conflict," in *The Routledge Handbook of Security Studies,* ed. Myriam Dunn Cavelty and Victor Mauer, (Canada: Routledge, 2010), 226.

Overall, there is no research that gives a clear link between climate change and the outbreak of hostilities, and it is unlikely to be found in the near future.[50] Most of the literature on such links is largely speculative.[51]

Global Economic Slowdown

Over time, the primary and secondary impacts of climate change could result in damages to the global market resulting in a global economic slowdown.[52] An increase in extreme weather events and the rising sea level could disrupt the already overstretched world energy supply system resulting in significant economic downturn. Additionally, increasing temperatures could result in a loss of productivity in the hottest regions, or will possibly result in a significant increase in energy demands to power air-conditioning systems. However, the total economic impacts from climate change are still highly uncertain.[53]

In summary, the primary impacts of climate change may lead to secondary impacts such as food and water shortages and a loss of productive land, which may lead to potential mass internal and external migration, which may exacerbate underlying tensions in zones of potential conflict leading to possible future conflicts. In combination, the primary and secondary impacts may lead to a reduction in the global economy. In general, the climate change secondary impacts

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[50] Ewan Sinclair, "The Changing Climate of New Zealand's Security: Risk and Resilience in a Climate Affected Environment," in *Climate Change and Security: Planning for the Future,* ed. Jonathan Boston, Philip Nel, and Marjolein Righarts, (New Zealand: Institute of Policy Studies, 2009), 74

[51] Nils Petter Gleditsch and Ole Magnus Theisen, "Resources, the Environment and Conflict…, 227.

[52] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 790.

[53] *Ibid.,* 790.

are more likely to affect the low latitude, less developed areas of the world as these areas are both more sensitive to climate change effects, and have less adaptive capacity than the more developed areas.[54]

However, the science on global and regional impacts of climate change is not yet exact, and because many of the secondary effects involve unpredictable human actions and reactions, any accurate prediction of secondary impacts is difficult. Additionally, many of these potential secondary impacts will take years to materialize, which will give time for the implementation of mitigation strategies and time for some adaptation to take place to these changes.

GLOBAL ADAPTATION AND MITIGATION

Throughout history, societies have demonstrated the ability to manage the impacts of weather and climate related events.[55] However, the ability to adapt is closely linked with the level of social and economic development of the affected society; the higher the level of economic and social development of a society, the greater its capacity to adapt to the effects of climate change.[56] The IPCC 2007 Report notes that "the capacity to adapt is dynamic and is influenced by a society's productive base, including natural and man-made capital assets, social networks and entitlements, human capital and institutions, governance, national income, health, and technology."[57]

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[54] *Ibid.,* 781.

[55] Kim Haddow,, "The Case for Adaptation," *Global warming, Natural Hazards, and Emergency Management,* Edited by Jane A. Bullock, George D. Haddow, and Kim S. Haddow. (Florida: CRC Press, 2009), 8.

[56] Gabrielle Walker, and Sir David King, *The Hot Topic…*, 66.

[57] IPCC, 2007, *Climate Change 2007: Synthesis Report…*, 14.

As the level of social and economic development is unevenly distributed around the world, the ability to adapt to climate change is also unevenly distributed. The areas identified previously as those likely to face the worst effects of climate change, are also in many cases some of the least developed regions of the world and therefore have limited adaptation and mitigation capacity.[58] However, even societies with a strong adaptive capacity remain vulnerable to climate change extremes.[59] As an example, the ability of developing countries to adapt their coastlines to the effects of climate change will be more challenging than for developed nations who have more engineering resources, but it is likely to be far more expensive in developed nations as greater expectations will be placed on governments to protect private property.[60]

Overall, there is significant adaptation potential within the world's markets and social systems, but the economic costs of adaptation are likely to be large, largely unknown and unevenly distributed around the world. [61] For the geophysical and biological systems, the adaptation potential is considerably less than for the human social and market systems.[62]

The developed world is starting to attempt to mitigate the effects of climate change by reducing the emissions of GHGs. Such international protocols as the 1997 Kyoto Protocol saw nations agree to reduce GHG emissions to their 1990 levels by 2012. [63] However, the economic costs of following such an agreement were high, especially when some of the larger GHG emitters (USA, China, and Australia) chose not to ratify this protocol. Overall, the Kyoto Protocol was not successful in reducing global GHG emissions. In 2009, more progress was

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[58] Gabrielle Walker, and Sir David King, *The Hot Topic…*, 176.

[59] IPCC, 2007, *Climate Change 2007: Synthesis Report…*, 14.

[60] R.J. Nicholls, P.P. Wong, …, "Costal Systems and Low-lying Areas…, 317.

[61] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 782.

[62] *Ibid, 782*.

[63] Ernest Zedillo, *Global Warming: Looking beyond Kyoto*, (Washington: Brookings Institution Press, 2009), 2.

made in reaching a global GHG emission reduction program at the Copenhagen Conference; although a binding agreement was not achieved.[64]

In summary, if GHG emissions are left unmitigated, in the long-term climate change would likely exceed the adaptive capacity of natural and human systems.[65] As the point at which a system's adaptive capacity is exceeded remains unknown, it is important that the causes of climate change are mitigated to gain the maximum time to enable natural and human systems to adapt to the effects of climate change.[66] Even if current levels of GHG emissions are significantly reduced or even just stabilized, the warming effects of the current levels of atmospheric GHG will continue for centuries.

THE CLIMATE CHANGE SCEPTICS

As a large amount of international effort is starting to be directed towards mitigating the effects of climate change, a number of scientists are sceptical about the causes and impacts of climate change. The scientist sceptics generally do not deny that climate change is happening, but they do disagree with many of the conclusions of the IPCC's reports. Some of these sceptics are not convinced that human activity is the main contributor to global warming, arguing instead that the earth experiences a natural cycle of warming and cooling. These sceptics argue that the earth climate cycles last tens of thousands of years, and to focus on the last 1000 years, and in

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[64] United Nations Framework Convention on Climate Change, *UNFCCC Press Briefing on the outcome of Copenhagen and the way forward in 2010*, http://unfccc.int/2860.php; Accessed: 31 January 2010.

[65] IPCC, 2007, *Climate Change 2007: Synthesis Report…*, 19.

[66] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 782.

particular the last 100 years, is scientifically flawed.[67] Many are also concerned with the certainty that the IPCC report gives in its conclusions. They argue that the science is not yet clear enough to reach some of the solid conclusions and recommendations found in the IPCC's report.

An Australian climate analyst John McLean scrutinized the IPCC 2007 Report and, in particular, the claim that all scientists involved completely agreed with the findings of the report. He found that:

> "A total of 308 reviewers commented on the final draft, but only 32 reviewers commented on more than three chapters and only five reviewers commented on all 11 chapters of the report. Only about half the reviewers commented on more than one chapter. It is logical that reviewers would generally limit their comments to their areas of expertise, but it's a far cry from the idea of thousands of scientists agreeing to anything."[68]

Additionally he discovered that the IPCC editors often ignored the recommendations of the reviewers or told the reviewers they were wrong. He notes that "in other cases reviewers tried to dilute the certainty being expressed and they often provided supporting evidence, but their comments were often flatly rejected."[69]

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[67] John R. Christy, "Evidence from Satellite Record," *Global Warming: The Science and the Politics*, ed. Laura Jones (Canada: The Fraser Institute, 1997), 61.

[68] John McLean, *The UN climate change numbers hoax,* http://www.onlineopinion.com.au/view.asp?article=7553&page=1, Accessed: 23 January 2010.

[69] *Ibid.*

Some scientists estimate that with 1-3° C of warming caused by an increase in CO2 levels, the global economy would actually grow because of the benefits provided to agriculture.[70] Although the IPCC 2007 Report does not agree with this estimate, due to the vastly different regional impacts of global climate change, whilst many areas may suffer, many areas will benefit if they successfully adapt to the changes.

As climate change is currently a hot topic, it is believed that certain institutions use climate change "scaremongering" to gain funding for research, and provide research results that are skewed towards supporting their views in order to gain future funding. Recently the British Climate Research Unit (CRU) was found to be providing false climate facts that supported the theory of climate change.[71] The CRU is one of the key institutions that the IPCC draws on for scientific support, which in turn is the report on which many governments base their climate policy.[72] This issue is currently causing a significant stir in the scientific climate community, although the IPCC has released a statement saying it still stands behind the findings of the 2007 report.[73]

In summary, although most scientists agree that the globe is warming, many do not agree with the certainty provided in the IPCC 2007 report. These scientists argue that the climate system is too complex and our understanding too limited to provide any real accurate predictions for the future. However, even amongst the sceptics most still think it is in the interests of

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[70] S.H. Schneider, S. Semenov, …, "Assessing Key Vulnerabilities and the Risk…, 790.

[71] James Delingpole, *The Great British Climate Fraud,* http://www.humanevents.com/article.php?id=34550; Accessed:30 January 2010.

[72] Christopher Booker, *Climate Change: This is the Worst Scientific Scandal of our Generation,* http://www.telegraph.co.uk/comment/columnists/christopherbooker/6679082/Climate-change-this-is-the-worst-scientific-scandal-of-our-generation.html; Accessed: 30 January 2010.

[73] IPCC, *Statement On News Reports Regarding Hacking Of The East Anglia University Email Communications* http://www.ipcc.ch/pdf/presentations/rkp-statement-4dec09.pdf; Accessed: 30 January 2010.

humanity to decrease the levels of CO2 emissions, which is one of the main goals of the IPCC 2007 Report.

SUMMARY

Climate change can be caused by natural or anthropogenic increases or decreases in the level of GHGs in the atmosphere. Current climate change concerns are focused on the anthropogenic GHGs and their global warming effect. A warming planet has a number of primary global impacts: melting of the polar ice caps, glaciers, and permafrost; rising sea level; changed weather patterns; and increased ocean acidification. In turn, these have possible flow on or secondary impacts such as food scarcity, migration, global economic slowdown, and conflict.

The exact extent of these primary and secondary impacts is not certain, but both natural and human systems have differing levels of adaptation ability. However, the IPCC assesses that without active mitigation policies, the pace of forecasted climate change will eventually overwhelm these natural adaptation abilities. Current global efforts are focused on agreeing to exactly what level of mitigation will be taken towards reducing GHG emission, but a set agreement is still to be reached. Climate change sceptics (or those who disagree with the IPCC) tend to agree that global warming is happening, but tend to disagree over the cause of the warming and what the exact impacts will be. Many of them argue that the science is not yet clear enough, and the climate system is too complex for accurate predictions.[74]

Overall, when looking to the future effects of climate change the IPCC 2007 Report notes "There are sharp differences across regions and those in the weakest economic position are

[74] John R. Christy, "Evidence from Satellite Record…, 73.

often the most vulnerable to climate change."[75] Considering the above factors, the next chapter will focus on the current and predicted impacts of climate change on New Zealand from both an internal and external perspective.

[75] IPCC, 2007, *Climate Change 2007: Synthesis Report…*, 19.

CHAPTER 2: THE IMPACTS OF CLIMATE CHANGE ON NEW ZEALAND

Although the IPCC 2007 Report acknowledges that it is difficult to predict regional impacts of climate change, and even more difficult to predict impacts within a country, it is still possible to determine some general impacts of climate change on New Zealand. In this chapter, the global impacts of climate change - as discussed in Chapter 1 - will be narrowed down to identify the impacts of climate change on New Zealand. This chapter will avoid being too futuristic, and will instead concentrate on the likely impacts of climate change within the next century.

The chapter proceeds in three parts. The first part will demonstrate that the New Zealand Government accepts that climate change is happening, the second part discusses the impacts of climate change internally to New Zealand, and the third part discusses the external impacts of climate change on New Zealand. This chapter will conclude that the negative internal impacts of climate change will be limited, but the negative external impacts will be more significant. By the completion of this chapter, the foundations for Chapter 3's security threat analysis will have been laid.

NEW ZEALAND GOVERNMENT'S STANCE ON CLIMATE CHANGE.

New Zealand's contribution to global GHG emissions is very small (0.3%), but it has the 12th highest GHG emissions per capita for the developed world. [76] Since 1990, New Zealand's

[76] Ministry for the Environment (NZ), *Making Good Decisions – Climate Change Effects*, 2007, http://www.mfe.govt.nz/publications/climate/making-good-decisions-climate-change-effects-dec07/making-good-decisions-climate-change-effects-dec07.pdf, Accessed: 01 February 2010.

GHG emissions have significantly increased, but extensive pine forest planting countered this increase, which will mean that New Zealand will meet its Kyoto Protocol obligations by 2012.[77]

Although New Zealand's GHG emissions are relatively high, it has established an international reputation as a clean 'green' country. This has enabled it to gain premium prices from its agricultural exports and has a continued positive impact on its tourist industry.[78] It is in New Zealand's interest to maintain this image, and by becoming a more sustainable society this will only further that image. The New Zealand Government is therefore generally very committed to 'green' initiatives, and it sees the fight against global warming as a great cause for New Zealand to get behind.[79] The New Zealand Government is actively working with other nations towards a global agreement on climate change following the end of the Kyoto Protocol in 2012.[80] The previous centre-left Labour Party government had a stated long-term goal of making New Zealand "the world's first truly sustainable nation."[81] However, the recent change to the center-right National Party government has seen a policy change that now advocates New Zealand playing its part in the global fight against climate change, as opposed to attempting to become a world leader in that fight.[82] This new policy acknowledges that environmentally friendly manufacturing and energy production can be more expensive than other techniques, and therefore the economic reality of implementing such a policy means that the New Zealand

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[77] New Zealand Government, *New Zealand's 2020 Emissions Target*, http://www.mfe.govt.nz/publications/climate/nz-2020-emissions-target/nz-2020-emissions-target.pdf, Accessed: 01 February 2010.

[78] Ralph Chapman, "A Way Forward on Climate Policy for New Zealand," Paper, Victoria University of Wellington, (2006), 5.

[79] Ministry for the Environment (NZ), *Making Good Decisions…*

[80] New Zealand Government, *New Zealand's 2020 Emissions Target…*

[81] Ministry for the Environment (NZ), *Making Good Decisions…*

[82] New Zealand Government, *Guardian criticism a reality check on climate change policy,* http://www.beehive.govt.nz/release/guardian+criticism+reality+check+climate+change+policy, Accessed: 30 March 2010.

economy will suffer in the short term. This means that any rapid push towards a 'truly sustainable nation' is economically and politically unfeasible.

The New Zealand Government is intending on reducing domestic carbon emissions by adopting the Emission Trading Scheme (ETS), which in effect will financially penalize GHG emitters.[83] However, the Government acknowledges that New Zealand cannot 'go it alone', and needs to ensure that it does not economically disadvantage itself by imposing strict carbon emission rules when its key trading partners are not.[84] The reality is that as a small nation at the bottom of the South Pacific, New Zealand's environmental policies will have very little impact on global GHG emissions.[85] Additionally, the recent economic crisis has meant that many businesses are currently focused on pressing financial considerations, as opposed to their 'carbon footprint'.[86]

The New Zealand Government has provided significant guidance to its regional government organizations in regards to adaptation strategies for a country affected by climate change.[87] It has advised all regional government organizations to seriously consider the impacts of climate change on any infrastructure or developments with a lifetime of more than 30 years, with particular focus on any coastal or water management issues.[88]

Overall, it is quite apparent that the New Zealand Government accepts that climate change is happening and that the activities of humankind are contributing towards this change.

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[83] Porter Novelli, *Climate Change Leadership Forum*, (New Zealand: Porter Novelli, 2009), 4.

[84] New Zealand Government, *New Zealand's 2020 Emissions Target*…

[85] Simon Upton, "What can a small country do to influence the course of human-induced climatic change?" Address, Victoria University Climate Change Conference, (28-29th March 2006).

[86] Porter Novelli, *Climate Change Leadership*…, 4.

[87] See the Ministry for the Environment (NZ) webpage at http://www.mfe.govt.nz/publications/climate/

[88] Ministry for the Environment (NZ), *Adapting to the Impacts of Climate Change,* http://www.mfe.govt.nz/publications/climate/adapting-impacts-climate-change-oct07/adapting-impacts-climate-change-oct07.pdf, Accessed: 01 February 2010.

The government continues to provide regular mitigation and adaptation guidance and direction to both the public and private sector, and is actively involved in international efforts to mitigate climate change. However, at the same time it accepts that New Zealand is a very small contributor to global GHG emissions, and that it is not in New Zealand's interest to impose strict GHG reductions that harm the national economy.

INTERNAL IMPACTS OF CLIMATE CHANGE ON NEW ZEALAND

The New Zealand Government has demonstrated that it wants to be a part of the international effort to reduce the global impacts of climate change, even though the exact physical impacts of climate change on New Zealand are still very difficult to predict. [89] Current climate models offer very broad possibilities, but these are still only predictions. A New Zealand Ministry of the Environment report notes, "climate change will, by and large, not create new risks, but may change the frequency and intensity of existing risks and hazards, as well as introducing some long-term shifts in climate regimes across the country."[90]

The greatest regional climate variability factor for New Zealand is the El Nino – Southern Oscillation cycle.[91] This natural cycle often leads to dryer conditions in the eastern and northern parts of the country.[92] At present, it is unknown what effect global warming will have

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[89] National Institute of Water and Atmospheric Research Ltd., *Changes in drought risk with climate change*, edited by Brett Mullan, Allan Porteous, David Wratt, Michele Hollis, http://www.maf.govt.nz/mafnet/rural-nz/sustainable-resource-use/climate/drought-risk-with-climate-change/changes-to-drought-risk.pdf, Accessed: 23 November 2009.

[90] Ministry for the Environment (NZ), *Climate Change Effects and Impacts Assessment: A Guidance Manual for Local Government in New Zealand (2nd Edition),* 2008, http://www.mfe.govt.nz/publications/climate/climate-change-effect-impacts-assessments-may08/climate-change-effect-impacts-assessment-may08.pdf, Accessed: 11 January 2010.

[91] B.C. Bates, Z.W. Kundzewicz, …, *Climate Change and Water…*, 90.

[92] Ministry for the Environment (NZ), *Climate Change Effects and Impacts Assessment…*

on the El Nino cycle, but current research indicates that global warming will enhance the frequency and effects of this event.[93]

Climate change will internally affect New Zealand in two key primary impact areas: the rising sea level, and changed weather patterns. The major global secondary impacts, as discussed in Chapter 1, will not have significant impacts internally to New Zealand, but will be discussed when addressing the external impacts of climate change on New Zealand. The two internal primary impacts are discussed below, followed by an examination of New Zealand's adaptive capacity to climate change.

Sea Level Rise

Since 1950, the sea level has risen by about 7cm,[94] and by 2090 it may have risen between 18-59cm.[95] By 2050, it is expected that the north-eastern areas of New Zealand will suffer from increased storm severity and coastal flooding from a combination of sea level rise and greater storm surges.[96] As a complicating factor, New Zealand is very prone to earthquakes. This means that regional effects of sea level rise could be negated or enhanced through earthquake activity, making exact impact forecasts more difficult.[97]

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[93] Ministry for the Environment (NZ), *Climate Change Impacts on New Zealand,* 2001, http://www.mfe.govt.nz/publications/climate/impacts-report/impacts-report-jun01.pdf, Accessed: 01 February 2010.

[94] K. Hennessy, B. Fitzharris, B.C. Bates, N. Harvey, S.M. Howden, L. Hughes, J. Salinger and R. Warrick, "Australia and New Zealand," *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* ed. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, (U.K: Cambridge University Press, 2007), 509.

[95] Ministry for the Environment (NZ), *Adapting to the Impacts of Climate Change…*

[96] K. Hennessy, B. Fitzharris, …, "Australia and New Zealand…, 509.

[97] Ministry for the Environment (NZ), *Climate Change Impacts on New Zealand,* 2001…

Coastal development around New Zealand has intensified in recent years. In time, the rising sea level will result in limited population displacement or expensive engineering to mitigate its effects.[98] Sea level rise will also have some limited effects on ground water through saltwater intrusion.[99] These factors will only increase the greater the rise in sea level. However, as sea level rise is likely to be a very gradual process spread over many years, there is time to implement policies to adapt to it or to mitigate it.

Changing weather patterns

Although sea level rise will cause problems over time, the greater impact of climate change will be from a change in the country's weather patterns. As a biological based economy, New Zealand relies on a relatively stable and mild environment to get the best from its agricultural and horticultural resources, and its economy is therefore vulnerable to any significant adverse changes in the weather.[100]

In general, the changed weather patterns will likely see the West coast of New Zealand get wetter, while the East coast is likely to get drier. [101] The West coast is very likely to receive more rainfall during winter and less is summer. From a positive aspect, this will provide more runoff for the South Island hydropower generation and will refill the hydro-storage lakes following the dryer summer, and from a negative aspect, there will be less water available for

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[98] Ministry for the Environment (NZ), *Adapting to the Impacts of Climate Change…*

[99] B.C. Bates, Z.W. Kundzewicz, …, *Climate Change and Water…*, 92.

[100] Ministry for the Environment (NZ), *Making Good Decisions – Climate Change Effects…*

[101] Ministry for the Environment (NZ), *Climate Change Impacts on New Zealand...*

irrigation during the summer months.[102] It is very likely that the westerly wind speed will increase, further enhancing wind-power generation capacity.[103] The northern and eastern regions of New Zealand are likely to receive less precipitation, which will have negative flow on effects to agricultural productivity, and will see a potential increase in fire danger.[104] Across all of the country, including those areas that will likely see a decrease in precipitation, the frequency of heavy rainfall events is likely to increase.[105]

By 2030, increasingly extreme weather activity is likely to exceed protection systems more frequently, such as flood banks, storm water drainage systems, and fire brakes.[106] Extreme weather events are likely to have a continued adverse effect on electricity distribution networks and other infrastructure, which will cause blackouts and a short-term disruption in economic productivity.[107]

New Zealand's temperature is likely to increase by approximately 1°C by 2040, which is lower than the global average.[108] This increase will be unevenly spread across the country, with a greater temperature increase in the North and a lesser increase in the South.[109] Although there will be some negative impacts in certain areas, many parts of New Zealand will see benefits to

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[102] K. Hennessy, B. Fitzharris…, "Australia and New Zealand…, 516.

[103] B.C. Bates, Z.W. Kundzewicz…, *Climate Change and Water…*, 91.

[104] National Institute of Water and Atmospheric Research Ltd., *Changes in drought risk with climate change*….

[105] Ministry for the Environment (NZ), *Preparing for Climate Change: A guide for local government in New Zealand*, 2008, http://www.mfe.govt.nz/publications/climate/preparing-for-climate-change-guide-for-local-govt/preparing-for-climate-change-guide-low-res.pdf, Accessed: 16 January, 2010.

[106] K. Hennessy, B. Fitzharris, …, "Australia and New Zealand…, 509.

[107] Ministry of Agriculture and Forestry (NZ), *Climate Change and its Impact on Agriculture and Forestry*…

[108] Ministry for the Environment (NZ), *Adapting to the Impacts of Climate Change,*

[109] Ministry for the Environment (NZ), *Making Good Decisions...*

agricultural and forestry output due to longer growing seasons, more rainfall and fewer frosts.[110] Future warming of the climate will initially increase crop productivity, but will also enhance the spread of destructive pests.[111] A warming climate will likely prolong the New Zealand summer tourist season, significantly increasing tourism revenue. However, due to its isolation, if tourists become more concerned about GHG emission from air travel, New Zealand may suffer adversely as tourists steer away from long haul air travel.[112]

Although climate change predicts certain impacts such as reduced precipitation and soil moisture levels in certain areas, not all water shortage incidents can be blamed on climate change. Water use in New Zealand has increased dramatically over the last 50 years through both a doubling of the population and a significant increase in irrigation, resulting in water availability pressures within certain regions.[113] Therefore, although climate change is likely to exacerbate water shortages in the eastern and northern regions given the predicted increased frequency of drought,[114] climate change is not the main cause of water shortages at present.

Overall, the weather patterns within New Zealand are likely to change because of climate change. In general, this will result in positive returns for New Zealand in the near to mid term primarily due to increased agricultural productivity. Although some areas will see negative impacts, these impacts can be adapted too through a change in land use.

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[110] Ministry of Agriculture and Forestry (NZ), *Climate Change and Agriculture and Forestry – Issues and Responses*...

[111] Ministry for the Environment (NZ), *Adapting to the Impacts of Climate Change…*

[112] Ministry for the Environment (NZ), *Making Good Decisions…*

[113] B.C. Bates, Z.W. Kundzewicz, …, *Climate Change and Water…*, 90.

[114] Ministry of Agriculture and Forestry (NZ), *Climate Change and its Impact on Agriculture and Forestry…*

Adaptation

New Zealand has a high adaptive capacity to the primary and secondary impacts of climate change, although many adaptation methods will be expensive and resource intensive.[115] The immediate adaptation priorities are "water and coastal issues, biodiversity, maintaining public infrastructure, and primary production."[116] Local government bodies have been encouraged to reduce predicted climate-induced costs by incorporating mitigating strategies into any future work programs, as opposed to conducting climate change specific programs.[117] The most vulnerable areas are the costal communities due to the effects of sea level rise. Any internal migration due to sea level rise can be managed relatively easily, as it is unlikely to effect large numbers of citizens in a short time frame. In many aspects, climate change just adds a new dimension to many of the problems already faced by New Zealand, as opposed to being a new problem itself.[118]

The following quote taken from the Ministry of Agriculture and Forestry report '*Situation and Outlook for New Zealand Agriculture and Forestry'* nicely sums up New Zealand's situation when considering its ability to adapt to the impacts of climate change:

> "Imagine the country that will cope best with climate change. The country would be an island state, because oceans smooth out the worst extremes of climate change. It would have a high ratio of coastline to land area and be in the roaring forties to optimize wind power and ensure plenty of water. The

[115] K. Hennessy, B. Fitzharris, …, "Australia and New Zealand…, 514

[116] Ministry for the Environment (NZ), *Making Good Decisions...*

[117] Ministry for the Environment (NZ), *Climate Change Effects and Impacts Assessment…*

[118] Ministry for the Environment (NZ), *Making Good Decisions…*

> country would be mountainous to provide hydro-power, be geologically active, and have rich volcanic soils and geothermal energy. It would also have a biologically based economy, because anything you can do with oil you can do with plants. In short, New Zealand is exceptionally well placed to adapt to changes created as a result of climate change."[119]

Summary

In summary, the internal impacts of climate change on New Zealand will be relatively low, and many regions will receive potential benefits in the near to mid-term. Climate change will benefit New Zealand in four areas: initial increased productivity in agriculture and forestry, reduced energy demand in winter, tourism will benefit from a warmer dryer climate during summer months, and additional rainfall in many parts will increase hydro-power capacity and increase irrigation capacity.[120]

Overall, it would appear that none of the internal impacts of climate change on New Zealand are a cause for grave concern. The area where climate change will cause New Zealand potential problems is from the primary and secondary impacts of climate change on other nations within the Asia Pacific region.

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[119] Ministry of Agriculture and Forestry (NZ), *Situation and Outlook*…

[120] K. Hennessy, B. Fitzharris, …, "Australia and New Zealand…, 524.

EXTERNAL IMPACTS OF CLIMATE CHANGE ON NEW ZEALAND

The global impacts of climate change (as discussed in Chapter 1) are more likely to cause New Zealand problems than the previously discussed internal impacts. The external impacts that could affect New Zealand are climate induced mass international migration, an increasing requirement to respond to international climate disasters, an increasing need to deploy stabilization forces to areas of conflict, and a reduction in the buying power of trading nations adversely affected by climate change. It is from these external impacts that a potential security threat could arise.

International Migration

Due to a combination of sea level rise and changing precipitation patterns, there is the potential for significant human migration within the Asia-Pacific region. Human migration will take place because the rising sea level will slowly swamp much of the very low-lying land in the region, and the changing precipitation patterns will affect food production and water availability, and therefore livelihoods. [121] Over the next century, the numbers of people involved could number into the tens of millions, although some estimates range up to 200 million.[122] However, due to the gradual changes in both sea level rise and precipitation patterns, this mass migration is unlikely to occur as a sudden massive event, and much of the migration may only be temporary

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[121] Jon Barnett, *Food Security and climate change in the South Pacific*, Pacific Ecologist, (Winter 2007), 32.

[122] Paul J. Smith, "Climate Change, Mass Migration and the Military Response," *Orbis*, (Fall 2007),

as people may try to return to their homes.[123] In addition, of the permanent migrants, it is unknown whether these people will migrate internally within their own nations or attempt to migrate to other nations.[124] For some very low lying island nations, as sea level rise will swallow the nation's land mass and thereby become the ultimate threat to the national survival, the people will have no choice but to become international migrants who will need to find a new nation to call home.[125] Overall, there is still a huge degree of uncertainty in regards to the numbers of possible climate migrants and what movement patterns they will create.[126]

Physically, New Zealand is a very isolated nation. Therefore, if climate change induced mass migration became international in nature, it is unlikely that excessive numbers of environmental migrants would be able to or would attempt to make their way to New Zealand through illegal methods. However, as New Zealand is a relatively rich country, and has a number of protectorates in the South Pacific, the New Zealand government will come under both domestic and international pressure to accept some of these environmental migrants, especially those from the South Pacific nations.

Across the developed world, there is an increasing trend towards anti-immigration policies as domestic populations often see migrants as a "threat" to their way of life.[127] Due to its physical isolation, New Zealand could follow this path relatively easily and not accept environmental migrants. However, depending on the political pressure surrounding an issue or the needs of New Zealand for skilled labour, New Zealand has traditionally been

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[123] Philippe Boncour, address on "Migration management and its linkages with economic, social, and environmental policies to the benefit of stability and security in the OSCE region," (18 May 2009).

[124] Gwynne Dyer, *Climate Change and Security…*, 45.

[125] Paul J. Smith, "Climate Change…, 632.

[126] Oli Brown, "The Numbers Game," in *Forced Migration Review*, Issue 31, October 2008, 8.

[127] Paul J. Smith, "Climate Change…, 629.

accommodating to international migrants and refugees. At present, New Zealand does not have policy for accepting migrants made homeless due to climate change, but does recognize that many Pacific nations are facing a significant threat from climate change.[128]

In summary, international migration because of climate change is unlikely to have a direct threat on New Zealand's security primarily due to New Zealand's physical isolation. However, many other nations will potentially suffer significant internal and external migration challenges because of climate change. At some stage in the future, New Zealand may require a policy to deal with environmental migrants once the possibility starts to become an issue, but this issue is unlikely to evolve into a direct security threat to New Zealand.

International Disaster Assistance Relief

As a result of climate change (primarily increased storm intensity) and the secondary effect of possible mass migration, the requirement for international disaster assistance relief is likely to increase in the coming decades. New Zealand regularly provides assistance to natural disasters in the Pacific region, and occasionally extends this assistance into the Asia region as for the 2004 Asia Tsunami. As climate change is likely to increase the intensity of tropical storms in the Pacific region, [129] and as New Zealand feels an obligation to assist in the Pacific,[130] this increase in storm intensity will require an increase in the level of response provided by New Zealand.

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[128] Ministry of Foreign Affairs and Trade, *New Zealand's Immigration Relationship with Tuvalu,* http://www.mfat.govt.nz/Foreign-Relations/Pacific/NZ-Tuvalu-immigration.php, Accessed: 03 February 2010.

[129] Jon Barnett, *Food Security and climate change in the South Pacific*, Pacific Ecologist, (Winter 2007), 33.

[130] Ministry of Defence (NZ), *New Zealand Defence Policy*, http://www.defence.govt.nz/defence-policy.html, Accessed: 25 March 2010.

The already stretched food supply in certain areas of the world will potentially reach breaking point due to climate change.[131] In the last eight years, grain consumption has been greater than production which has reduced the world's grain reserve down to 54 days of supply in 2009, down from 116 days of supply ten years ago. [132] A continuation of this trend will result in significant humanitarian crises requiring massive international assistance and aid to overcome. As a good 'international citizen', it will be in New Zealand's interest to assist with this international effort, especially with New Zealand's likely increased food productivity in a climate-changed world.

Overall, it is unlikely that such factors will threaten New Zealand's physical security, but such international disasters may threaten New Zealand's regional and international security interests.

Deployment of Stabilization Forces

The combination of changed weather patterns, increased natural disasters, and the impacts of mass migration may lead to instability within certain nations and regions. As climate change is likely to affect many of the nations with the least capacity to adapt or mitigate its effects, its impacts are likely to increase underlying economic and social tensions in certain areas, which may spark conflict. The effects of climate-induced migration will potentially cause significant internal security problems for some nations that may overwhelm their national security capabilities. These factors may lead to the requirement to deploy international stabilization and humanitarian forces to assist affected nations. Any such deployment would

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[131] Gwynne Dyer, *Climate Change and Security…*, 6.

[132] *Ibid.*, 25.

have to be carefully managed so as not increase the suffering of those affected by climate change, as otherwise it may lead into greater security problems such as terrorism and insurgencies.[133]

All nations within the Asia-Pacific region rely on a politically and economically stable region to enable the free flow of trade.[134] As New Zealand has a long history of providing peace-keeping forces within the Asia-Pacific region, it is highly likely that New Zealand would participate in such stabilization missions in the future. Although the conduct of climate induced security operations will be similar to other security operations, the possible simultaneous scale of the operations could stretch New Zealand's limited military resources, requiring a prioritization of effort.

Although military forces may be deployed as a result of the effects of climate change, ongoing mitigation and adaptation strategies can help reduce such requirements. New Zealand's Ministry of Foreign Affairs and Trade (MFAT) conducts ongoing aid and development programs within the South Pacific, and the New Zealand Defence Force conducts regular exercises and exchanges within the region, to help reduce the possibility that a source of tension will lead to conflict.[135] It is not in the interests of New Zealand to allow the South Pacific nations to fail or be overwhelmed by the effects of climate change.

The requirement for New Zealand to deploy military forces because of the impacts of climate change is quite possible in the medium term. As climate change is likely to be a slow process, there is time for international organizations to assist less developed nations to adapt to its impacts, if the political will to assist is there. At present, the international will to assist less

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[133] Paul J. Smith, "Climate Change…, 633.

[134] Australian Government, "Defending Australia in the Asia Pacific Century: Force 2030," Defence White Paper, (2009), 33.

[135] Ministry of Defence (NZ), *New Zealand Defence Policy...*

developed nations when it comes to adapting to possible climate change impacts is limited. However, as the impacts of climate change start becoming more obvious, this political will to assist is likely to start increasing. In the meantime, the New Zealand Government will continue to determine if the deployment of its military forces to assists in stabilizing troubled areas is an appropriate response, and whether it is in the national interest do so.

Impacts on International Trade and Trading Partners

One of the greatest potential areas of concern for New Zealand is the impact of climate change on its trading partners. New Zealand is an exporting nation that requires overseas markets to sustain its economy, and many of its markets are in the Asia-Pacific region.[136] In fact, 71% of New Zealand's exports go to APEC (Asia Pacific Economic Cooperation) countries, and 72% of New Zealand's imports come from these countries.[137] If some of these more important APEC nations are adversely affected by climate change, then there will be a negative impact on New Zealand's economy until new markets are realized.

As previously mentioned, New Zealand's agricultural productivity is likely to rise as the climate warms, meaning that New Zealand will likely have more primary produce to export.[138] With the global population forecasted to rise significantly in the next 50 years and with the resulting increased global demand for food, New Zealand will potentially benefit from an

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[136] Ministry of Foreign Affairs and Trade (NZ), *Trade Agreements*, http://www.mfat.govt.nz/Trade-and-Economic-Relations/Trade-Agreements/index.php, Accessed: 14 February 2010.

[137] Ministry of Foreign Affairs and Trade (NZ), *Asia-Pacific Economic Cooperation (APEC)* http://www.mfat.govt.nz/Media-and-publications/Publications/Trade-matters/0-apec.php, Accessed: 25 March 2010.

[138] Ministry of Agriculture and Forestry (NZ), *Climate Change and its Impact on Agriculture and Forestry*…

increased export market if it can successfully find trading partners for its produce. However, the possible spread of destructive pests to New Zealand due to a warming climate may result in trade restrictions jeopardizing the openness of some of these markets. Additionally, the concept of 'carbon foot-printing' forestry and agriculture products may have an adverse impact on New Zealand's trade with its long distance partners.[139]

New Zealand is reliant on imported oil to sustain its economy.[140] If climate change adversely affects the trade in oil through either conflict or increased storm activity, then this could be a significant problem for New Zealand. However, as the world relies on the international flow of oil, New Zealand would not be alone in this matter. As a member of the International Energy Agency (IEA), New Zealand's access to a reliable energy supply is, to a degree, protected.[141]

Overall, the impacts of climate change on New Zealand's international trade are potentially both positive and negative. New Zealand, like most nations, relies on international trade for its economy to continue functioning. A significant disruption to the trade routes or to its current trading partners would negatively affect the economy; whereas an increased demand for New Zealand's primary produce would be positive.

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[139] Ministry of Agriculture and Forestry (NZ), *Situation and Outlook for New Zealand Agriculture and Forestry.…*

[140] Ministry of Economic Development, *NZ oil exports now 70% of oil imports new quarterly statistics show*, http://www.crownminerals.govt.nz/cms/news/2008/nz-oil-exports-now-70-of-oil-imports-new-quarterly-statistics-show, Accessed: 14 February 2010.

[141] International Energy Agency, *About IEA*, http://www.iea.org/about/index.asp, Accessed 30 March 2010.

In summary, the external impacts of climate change are likely to cause New Zealand more problems that the internal impacts. However, due to New Zealand's isolation, New Zealand can, to a degree, physically isolate itself from these external impacts if it decides to do so. However, at present New Zealand is committed to working on the international stage to help mitigate and adapt to climate change. The Prime Minister of New Zealand, John Key, stated at the 2009 Copenhagen climate conference that "New Zealand is committed to doing its fair share in the global effort, including taking responsibility for emissions reductions and contributing to international finance and technology support."[142]

SUMMARY

It has been demonstrated that the New Zealand Government accepts that climate change is happening, and has implemented a number of policies in an attempt to mitigate and adapt to its potential impacts. Internally to New Zealand, the exact impacts of climate change are difficult to predict, but the indications are that in the short to medium term the majority of New Zealand will see benefits because of climate change primary impacts. The external impacts of climate change on New Zealand are likely to cause more problems for New Zealand, but because of New Zealand's physical isolation, these impacts can, to a degree, be managed through the implementation of sound government policy.

Although New Zealand will not be overwhelmed by the effects of climate change, it will feel the effects through its global trade relations and its close association with Pacific nations.

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[142] New Zealand Government, *Prime Minister John Key's Statement to the Copenhagen Conference – 18 December 2009*, http://www.beehive.govt.nz/speech/new+zealand+statement+-+climate+change, Accessed: 14 February 2010.

Overall, it could be summarized that the impacts of climate change will primarily be economic in aspect.

It is apparent that climate change in itself will not cause security problems for New Zealand, but it is potentially going to exacerbate other problems externally to New Zealand, which could become security concerns. These problems in themselves will not be new, but in a climate changing environment these problems may intensify in either duration or frequency. Whether these security concerns can be categorized as security threats depends on the understanding and interpretation of what constitutes a threat. This will be the topic of Chapter 3.

CHAPTER 3: NATIONAL SECURITY THREATS AND CLIMATE CHANGE

As the world is anarchical in nature, to give meaning to any links between climate change and security, such links must be determined from the perspective of each individual nation. As nation-states are the building block of the world, and as failed states have wider regional impacts beyond their own borders, the even greater security question is, 'Does climate change threaten the national security of a particular nation?' In this chapter, taking into account the previous chapters findings, this question will be answered from New Zealand's perspective.

This chapter will demonstrate that climate change is not a national security threat to New Zealand. Specifically, in spite of the numerous views on security and what constitutes a threat, and acknowledging the potentially significant challenges posed by climate change, climate change will not threaten the survival of New Zealand as an independent nation.

This chapter will be broken down into three parts. The first part will examine the meaning of national security, the second part will discuss what constitutes a threat, and the final part will link climate change and the national security of New Zealand.

WHAT IS NATIONAL SECURITY?

National security is a concept that all citizens of a nation know to be important, but defining national security can be a difficult task. In fact, from a United Nations perspective, security is not defined in any of the key United Nations documents, and its meaning must be

defined depending on the United Nations provisions and how they are interpreted for a particular situation.[143]

Since the end of the Cold War, the security definition debate has intensified as scholars attempted to define what the focus of security should be.[144] In general terms, there are four broad camps into which definitions fit: one focused on physically protecting the nation-state, another on the intertwined factors that make up a nation's power (political, economic, military, access to resources, and a sustainable environment), another focuses on protecting individuals, and finally a focus on abstract values that the nation holds dear.[145] The first three of these will be briefly investigated, with a determination of whether climate change is a security matter for each definition.

Traditional Security

Traditional definitions of security have been state focused. Traditional security is about maintaining sovereignty over the nation, and protecting its citizens.[146] To assist this, there lies a mutual agreement amongst all states of non-interference in other states' internal affairs.[147] Security was guaranteed by having a military strong enough to defend the state and protect the interests of the state, or through international treaties to guarantee the state's security. This

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[143] Marco Sassoli, "The Concept of Security in International Law Relating to Armed Conflict," in *Security: A Multidisciplinary Normative Approach,* ed. Cecilia M. Bailliet, (Boston: Martinus Nijhoff Publishers, 2009), 8.

[144] Pauline Kerr, "Human Security and Diplomacy," in *The Routledge Handbook of Security Studies,* Edited by Myriam Dunn Cavelty and Victor Mauer, (Canada: Routledge, 2010), 116.

[145] Robert Mandel, *The Changing Face of National Security: A Conceptual Analysis*, (USA: Greenwood Press, 1994), 18-20.

[146] Goff, Phil, "The Ethics of Foreign Policy" in *The Ethics of Foreign Policy,* Edited by David B. MacDonald, Robert G. Patman, and Betty Mason-Parker, USA: Ashgate Publishing, 2007, 198.

[147] Axworthy, Lloyd, "Human Security: An Opening for UN Reform," in *The United Nations and Global Security,* Edited by Richard M. Price and Mark W. Zacher, New York: Palgrave MacMillan, 2004, 247.

traditional understanding of security was primarily focused on deterring military threats against the nation, to enable the nation to prosper through economic means.

From this more traditional perspective of security, climate change is not a security matter for New Zealand as it will continue to exist as a country regardless of the impacts climate change. At worst, the standard of living within New Zealand may be decreased due to global economic instability, but as noted in Chapter 2, New Zealand is more likely to benefit from the effects of climate change in the short to medium term.

Contemporary Security

With the end of the Cold War in 1989, the likelihood of major inter-state conflict has declined in the last twenty years. As a result, this relatively narrow traditional definition of security with its focus on military power proved limited and the definition of security has been significantly enlarged over recent years.[148] Today, security is often described as a combination of intertwined but diverse factors such as the nation's military force, its economic capacity, its social structure and stability, its environmental footprint and sustainability, and its political structures and ideology.[149] These taken in combination give a nation its security. A disruption to one may compromise the others and therefore constitute a security concern. This broader definition of security may include such concerns as diverse as sub-national and trans-national threats, invasive environmental pests, the proliferation of weapons of mass destruction,

[148] S. Neil MacFarlane, and Yuen Foong Khong, *Human Security and the UN: A Critical History,* (USA, Indiana University Press, 2006), 127-133.

[149] See: Barry Buzan's *People States and Fears: The National Security Problem in International Relations,* (1991) (2nd edn); Robert Mandel's *The Changing Face of National Security*, (1994); and Paul D. Williams' *Security Studies: An Introduction,* (2008), for further expansion on this more modern definition of security.

economic recession, massive population growth, and environmental pollution, to name but a few.[150]

Under this wider interpretation of security, climate change could be considered a security matter, as it will possibly affect New Zealand's economic stability and energy supplies at some stage in the future. However, as discussed in Chapter 2, New Zealand is likely to economically benefit in the short to medium term from climate change as the growing season for primary produce increases thereby potentially increasing exports. The critical factor is how quickly climate induced change happens and how adverse the change is to global economic stability.

Human Security

A more recent trend in the security definition debate has been the emergence of the human security paradigm. Whereas under traditional definitions, the object to be secured is the state, under human security, the object is the individual human being.[151] Under human security, the underwriter of national security is not military power, but the right political, social and economic conditions, human rights, human development, and equal opportunities.[152] The United Nations Human Security Unit defines human security as, '… protecting fundamental freedoms – freedoms that are the essence of life.'[153] Under human security, such factors as hunger, poverty, underdevelopment, political violence, and gender discrimination may all be considered security

[150] Robert Mandel, *The Changing Face…*, 19.

[151] Pauline Kerr, "Human Security and Diplomacy…, 115.

[152] Shahrbanou Tadjbakhsh and Anuradha M. Chenoy, *Human Security: Concepts…*, 167.

[153] United Nations Human Security Unit, *Human Security Unit: Overview and Objectives*, http://ochaonline.un.org/HumanSecurityUnit/tabid/2212/language/en-US/Default.aspx, Accessed: 11 April 2010.

concerns as they all affect individual's well-being.[154] In effect, under the broad definition of human security, almost anything can be considered a security concern.[155]

Although accepting the role that states play, human security proponents argue that a states role is to protect its citizens, as otherwise its purpose and legitimacy is questionable.[156] Human security advocates argue that if individual security needs are addressed, the likelihood of a collective or national security threat arising is minimized.[157] More recently, human security proponents have started to move away from placing their theory in confrontation with state-centric security theory, and instead see human security ideas working in conjunction with state security and not as an alternative.[158] Because of human security concerns, the United Nations adopted a concept known as 'responsibility to protect' (RtoP).[159] Under this concept, nations have "a responsibility to respond in a timely and decisive manner" into the sovereign territory of another nation if that nation is not protecting its citizens from "genocide, war crimes, ethnic cleansing and crimes against humanity, and from their incitement."[160] This obviously raises a large number of international law issues, and when intervention has happened, it has been mired in controversy.[161] In addition, RtoP's arguable focus on military intervention has caused a

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[154] Fen Osler Hampson, "Human Security," in *Security Studies: An Introduction,* ed. Paul D. Williams, (New York: Routledge, 2008), 230-231.

[155] S. Neil MacFarlane, and Yuen Foong Khong, *Human Security…,* 237.

[156] Pauline Kerr, "Human Security and Diplomacy…, 117.

[157] Philippe Boncour, address on "Migration management and its linkages...

[158] Shahrbanou Tadjbakhsh, and Anuradha M. Chenoy, *Human Security: Concepts…,* 167.

[159] Ban Ki-moon's, address at an event on "Responsible Sovereignty: International Cooperation for a Changed World", in Berlin, 15 July 2008, http://www.un.org/News/Press/docs/2008/sgsm11701.doc.htm, Accessed: 11 April 2010.

[160] *Ibid.*

[161] Shahrbanou Tadjbakhsh, and Anuradha M. Chenoy, *Human Security: Concepts…,* 197.

degree of concern amongst human security proponents.[162] Although there has been much written on the concept of human security, it still struggles to bridge the gap of informing practical meaningful policy.[163]

As climate change primary and secondary impacts have the potential to threaten the well-being of many people within certain nations of the world, it can be considered a human security matter. As discussed in Chapter 1, many of the nations likely to be hit the hardest by climate change also have the least adaptive capacity, thereby potentially increasing the suffering of those people. Due to New Zealand's high adaptive capacity and national social welfare programs that could take care of the needs of any effected individuals, climate change will not cause any significant internal human security concerns.

In effect, security definitions have become so broad that to a degree they have become meaningless, and the core security concerns of a nation can be lost amongst all the clutter.[164] At its core, a nation-state is concerned about maintaining it physical integrity, maintaining sovereignty, maintaining the political and social structure of the nation, protecting its citizens, and, to a degree, maintaining its international obligations.[165] It is these things that will not be sacrificed, and it is these things that can be considered national security matters. As a basic test, if a head of government states that a particular matter is a national security matter, then the population should be deeply concerned about their national survival and way of life. If this does not happen, then the matter is not a national security matter, but it may still be a security concern

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[162] *Ibid.,* 196.

[163] Fen Osler Hampson, "Human Security…, 243.

[164] John Baylis, J.J. Wirtz, Eliot A. Cohen, and Colin S. Gray, *Strategy in the Contemporary World*, (New York: Oxford University Press, 2007), 13.

[165] Phil Goff, "The Ethics of Foreign Policy…, 198.

that will require some form of policy adjustment. With climate change's huge regional differences, each nation must determine for itself if climate change is a national security matter. Having now defined what constitutes national security, a national threat can now be determined.

WHAT CONSTITUTES A THREAT?

A nation may have many security concerns, but these to not automatically make them a national security concern, and only occasionally will a national security concern become a national security threat. As with many things, the definition of what constitutes a threat depends on a person's or organization's point of view. In order to demonstrate this, international relations theory provides a suitable tool to show how different points of view can come about. Although there are numerous different international relations theories, the two key groups are realism (including neoclassical realism) and liberalism (including neo-liberalism). It is important to note that within each theory, there are numerous different interpretations of the theory, and neither grouping is a unified one. [166] In addition, it can be argued that international relations are in fact too complicated to allow any particular theory to accurately describe the international structure.[167] However, for demonstrating how threats may be perceived, international relations theory provides a suitable tool.

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[166] Charles W. Kegley, Jr., "Theories of World Politics," in *World Politics: Trend and Transformation, 12th ed*, ed. Charles W. Kegley, Jr. with Shannon L. Blanton, 22-49, (Boston, MA: Wadsworth, 2009), 38.

[167] Jennifer Sterling-Folker, *Making Sense of International Relations Theory*, (USA: Lynne Rienner Publishers Inc., 2006), xii.

A Realist Perspective

The realist view assumes that international society is anarchical, and that as a consequence states focus on their own power as the means to provide security. [168] States do things for their own interests and not for the international common good, unless the state gains an advantage from the international arrangement that increases the state's relative power.[169] In turn, this pursuit of power without a central body to control it – anarchy – means that achieving security is difficult unless the anarchy issue is addressed.[170] Although realism cannot explain all factors of international relations, from a realist perspective a threat maybe defined as something that threatens the survival of the state or the power that the state has accumulated.

Climate change is an unbiased entity that does not seek power, nor does it seek to occupy states. It does not have any of the traditional components of a state-based threat: aggressive intentions, a geographic location, or hostile capabilities.[171] A nation cannot declare war upon climate change, or attempt to undermine its power through an indirect approach. Classic security responses such as increasing the strength of the military or forming strong alliances cannot address climate change. Nations can only attempt to mitigate its magnitude (either individually or collectively) and adapt to its impacts within their capacity to do so

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[168] Ian H. Rowlands, "Classical Theories of International Relations," in *International Relations and the Global Climate Change*, ed. Urs Luterbacher and Detlef F. Sprinz, 43-65, (USA: The MIT Press, 2001), 43.

[169] Jennifer Sterling-Folker, *Making Sense…*, 14.

[170] William C. Wohlforth, "Realism and Security Studies" in *The Routledge Handbook of Security Studies,* ed. Myriam Dunn Cavelty and Victor Mauer, (Canada: Routledge, 2010), 10.

[171] *Ibid.*, 15.

For some island states like the Maldives, climate change is the ultimate threat to their national survival, as with rising sea levels the nation is likely to cease to exist.[172] In response, the Maldives have used diplomatic means to raise the international awareness of climate change, is using civil engineering structures such as sea walls for certain islands, and, long term, is looking for an alternative place to resettle.[173] They have not used the military (a national security tool) to address the impacts of climate change.

As climate change is an unbiased entity, it in itself is not a threat (except to nations like the Maldives). It is the human reactions to the impacts of climate change, in combination with other factors, which may cause insecurity within a certain area. As a hypothetical example (and acknowledging the complexities involved with the causes of human migration), if as a result of climate change there is less precipitation in one area and people gradually migrate to another area and settle there, there is the possibility that this may cause tension with those people already established in that location.[174] However, the level of tension will depend on the carrying capacity of the new area (i.e. is it already overcrowded?), the ability of both the migrant and established populations to integrate, and the ability of the local government to address any tension before it escalates. If these factors are negative then there is the remote possibility that such tension could escalate into conflict. However, this chain of events and possibilities all rely on human responses to the initial climate change triggered situation of less precipitation. It is the human responses to the effects of climate change that will determine if insecurity arises. As it is human responses to a situation that causes conflict, climate change in itself does not pose any threat to security.

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[172] Ilan Kelman, "Island Evacuation" in *Forced Migration Review*, Issue 31, (October 2008), 20.

[173] Maldives Ministry of Housing, Transport and Environment, *National Adaptation to Climate Change,* http://www.maldivespartnershipforum.gov.mv/pdf/Adaptation%20to%20Climate%20Change.pdf, Accessed:10 April 2010.

[174] Jef Huysmans, and Vicki Squire, "Migration and Security…, 171.

Some of the climate tipping points described briefly in Chapter 1 have greater potential to threaten the national survival of nations. However, such events are considered unlikely, and are the worse case scenario. Even if they do happen, greater insecurity will not necessarily be the result.[175] Again, it will still be the human response that determines the final result.

For the majority of nations, climate change is not going to threaten their national survival, but it may reduce their national power to a degree. The reality is that those nations currently with power are best suited to be able to adapt to climate change, whereas those nations with very limited power are also less likely to be able to adapt as successfully. Therefore, relative power is unlikely to be sufficiently threatened by climate change. From a realist point of view, it is difficult to describe climate change as a threat to national security, as the far majority of nations will continue to exist in a climate-changing world.

A Liberalist Perspective

The liberal view is that although the world is anarchical by nature, there is a pacifying effect brought about by "political liberty, economic freedom, interdependence and international association,"[176] with neo-liberalism being focused on the international institutions that promote international cooperation and stability.[177] The individual and the rights of the individual are very important to the liberal perspective, as is the stability provided through the 'democratic peace,' international agreements and trade.[178] Liberalism is about reducing global anarchy and forming

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[175] Alan Dupont, "The Strategic Implications of Climate Change," in *Survival,* 50:3, 29-54, (2008), 43-44.

[176] David L. Rousseau, and Thomas C. Walker, " Liberalism" in *The Routledge Handbook of Security Studies,* ed. Myriam Dunn Cavelty and Victor Mauer, (Canada: Routledge, 2010), 21.

[177] Charles W. Kegley, Jr., "Theories of World Politics…,, 25 & 37.

[178] David L. Rousseau, and Thomas C. Walker, "Liberalism…, 21.

strong global institutions that will further promote global advancement and global order. The nations of the world are economically interdependent, and this interdependence helps keep the world relatively stable.[179] However, liberals also accept the important position that a state plays in defining international relations.[180] At present, most nations are prepared to forego a degree of sovereignty on certain matters in order to conform to global agreements, which overall benefits the individual nation.[181] As liberalism is more global in its outlook, any situation that may threaten global stability and cooperation may be considered a threat. As climate change has a global impact, and its overall effects are highly likely to be negative, it can be considered a threat regardless of whether any particular nation benefits or suffers because of climate change.

From a more positive perspective, climate change also has the potential to increase global cooperation. Due to climate change being a global problem that in the end will require a global solution, there lies the potential that such a solution will actually help increase the power of global institutions and potentially increase global stability.[182] Although the recent Copenhagen conference was a failure in that it did not reach the goal of an international binding agreement to reduce GHG emission, it did help bring climate change to the forefront of global politics. As an example, climate change mitigation is one of the key discussion topics for the upcoming 2010 G8/G20 summit in Toronto, Canada.[183]

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[179] Robert Jervis, "The Era of Leading Power Peace" *in International Politics: Enduring Concepts and Contemporary Issues (Eighth Edition)*, ed. Robert J. Art and Robert Jervis, (New York: Person Longman, 2007), 375.

[180] Jennifer Sterling-Folker, *Making Sense…*, 55.

[181] *Ibid.,* 57.

[182] Nils Petter Gleditsch, and Ole Magnus Theisen, "Resources, the Environment and Conflict…, 228.

[183] Jenilee Guebert, *Plans for the 2010 G8 Muskoka Summit: June 25-26, 2010,* http://www.g8.utoronto.ca/evaluations/2010muskoka/2010plans/2010-g8plans-100326.pdf, Accessed: 10 April 2010.

History has shown that democracies do not fight internally or against each other for any reason (democratic peace), and it is unlikely that they would do so over the impacts of climate change.[184] This indicates that if conflict is to occur over climate change impacts, it will likely occur in the developing world, where there are fewer democratic governments. As there are currently over 30 armed conflicts ongoing in the developing world,[185] climate change may increase this number, but such conflicts are unlikely to threaten the current level of global peace.

Climate change can therefore be considered a threat to national security, or not, depending on one's theoretical perspective of the world. However, whilst many people in the West understand how globalization is changing the world, the vast majority of people still feel a strong sense of loyalty towards their own country. Therefore, when identifying a threat from a nation-state perspective, the threat must have the ability to significantly affect the nation, and the nation must have a lack of capacity to deal with these impacts. If the nation has the capacity to deal with the possible impacts, then it can be argued that it is not a valid threat at all, but a concern that will require an appropriate policy adjustment in a timely manner. Additionally, when determining a threat, there must be a required sense of urgency to respond to the matter. Regardless of how one sees the world or the role that states play within it, determining the difference between a threat and a concern can be defined by two components: a current lack of capacity and a perceived sense of urgency.

In New Zealand's case, as discussed in Chapter 2, climate change is likely to affect New Zealand less than many other parts of the world. As these effects overall are likely to be positive in the short to medium term, before potentially becoming negative in the long term, New

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[184] Nils Petter Gleditsch, and Ole Magnus Theisen, "Resources, the Environment and Conflict…, 224.

[185] *Ibid.,* 221.

Zealand has significant time to adapt to the primary impacts of climate change. Also as discussed in Chapter 2, the New Zealand government is already implementing policies to ensure that New Zealand is not caught off guard by climate change.

In combination, the significant time available to New Zealand and its strong adaptive capacity indicate that climate change does not constitute a threat. With this in mind, the focus of the paper turns to linking climate change and national security to determine their relationship for New Zealand.

CLIMATE CHANGE AND THE NATIONAL SECURITY OF NEW ZEALAND

When writing on climate change and security most authors readily admit that the possible scenarios they present are often the worst-case scenario and not the most likely. In a worse-case scenario such as a climate tipping point, climate change may result in a "rise in economic nationalism, increased inter-state conflict and higher levels of global insecurity."[186] The problem becomes that too often the public and politicians disregard the fact that these are the worst-case scenario, and it becomes perceived as a likely scenario, and thereby gives an inflated impression of the threats to security posed by climate change. Additionally, often many of these worse-case scenarios are no different to the problems already faced in many parts of the world, although it is argued that climate change is likely to exacerbate already existing social and political tensions within areas of current or future insecurity.[187]

New Zealand is geographically very isolated, making it difficult to get to without a blue water capability or long haul aircraft. Therefore, even if climate change does cause a sudden

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[186] Gwynne Dyer, *Climate Change…*, 6.

[187] Ewan Sinclair, "The Changing Climate of New Zealand's Security…, 71.

mass migration of people (which in itself is a worse case scenario), it is unlikely that they would attempt to make their way to New Zealand in vast numbers. It is possible that indirect security-related activities such as piracy may increase within climate change affected regions and thereby interfere with New Zealand's international shipping needs, but this can be addressed through serious international resolve. Internally, New Zealand is economically and politically well developed and has little social tension, meaning that its capacity to adapt to the impacts of climate change is strong.[188]

It is possible to argue that insecurity within certain areas will decrease potential trading partners. However, as discussed in Chapter 1, the world is likely to suffer a shortage of primary produce in the coming century. New Zealand is thus unlikely to struggle to find trading partners for its primary produce exports in light of this expected shortfall.

In the coming century, New Zealand's future security environment will likely become increasingly complex, with a wide variety of potential challenges facing the world.[189] As an example, with a global population forecasted to increase to 8.9 billion by 2050 (a 47% increase from 2004)[190] massive overcrowding will increase in poorer areas, the rich-poor divide will increase, resource demands will exponentially increase, and in combination these factors will cause social tensions to rise. Climate change is likely to amplify the severity of these problems, but it will only be one factor amongst many when looking for future areas of insecurity within New Zealand's strategic area of interest. When these points of insecurity do arise, the belligerent forces are unlikely to be any direct threat to New Zealand, and New Zeal and will be able to decide if it becomes involved in the conflict or not.

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[188] Phil Goff, "The Ethics of Foreign Policy…, 201.

[189] Ewan Sinclair, "The Changing Climate of New Zealand's Security…,75.

[190] United Nations Department of Economic and Social Affairs, *World Population to 2300*, New York: United Nations, 2004, 4.

Currently, the international community pays little attention to many of the numerous conflicts around the world. The argument that the New Zealand Defence Force will become overwhelmed by a possible exponential increase in security situations as a result of climate change would only be valid if New Zealand became involved in every single conflict, which it currently does not and is unlikely to do. Additionally, it has been shown that the causes of conflict are complex, and to state that climate change alone will cause conflict is not supported by research.

Overall, climate change is not a national security threat for New Zealand. It is still a very serious concern for New Zealand, but linking it to national security will provide little real insight to the problem.

SUMMARY

This chapter has argued that climate change is not a national security threat to New Zealand. The meaning of security was looked at from the perspective of a traditional understanding of security, a broader definition of security, and finally through the concept of human security. The chapter determined that national security is concerned with maintaining the physical integrity of the nation, maintaining sovereignty, maintaining the political and social structure of the nation, protecting its citizens, and, to a degree, maintaining its international obligations. These factors are considered matters of national security because a nation will only compromise a small amount on these points if absolutely necessary, and if these factors are completely compromised, the nation as it is currently known would cease to exist.

When examining what constitutes a threat, international relations theory was used to demonstrate how differing points of view could be reached when considering the international

impacts of climate change. From a realist perspective, as most states will continue to exist in a climate-changed world, it is not a threat to the existence of the majority of nation states. However, from a liberalist perspective, the threat posed by climate change is a bit more complicated. It may disrupt the economic interdependence of the world and increase global anarchy and is therefore a threat, or it may strengthen global institutions as the world comes together to solve a common problem, and is therefore not a threat. When looking at a threat from a purely national perspective, it was determined that two factors were critical in differentiating between a national concern and a national threat: a current lack of capacity, and a perceived sense of urgency to deal with the matter.

Having considered the concept of national security and what constitutes a threat, it was determined that climate change was not a threat to the national security of New Zealand. Climate change has the potential to cause New Zealand many issues over the next century, but these issues do not threaten New Zealand's national security. Although for other nations in the world, climate change in combination with other factors may become a national security threat, this does not automatically make it a national security threat to New Zealand. The issues that climate change raises for New Zealand will be numerous, but these issues can be dealt with through appropriate policy in a timely manner.

It is quite clear that humanity is far from done with conflict. Climate change may enhance the insecurity of some nations, but overall, the world will have enough conflict, suffering and insecurity with or without climate change. It is also quite apparent that climate change has the potential to cause many other issues for the world in the coming centuries, but the security concerns that may arise are really no different to the ones already encountered.

This chapter argued that for a matter to be considered a national security threat there must actually be a threat to a nation's survival. For a highly adaptive nation like New Zealand, a

problem that can be dealt with through appropriate and timely policy is unlikely to threaten the nation's survival. In New Zealand's case, climate change is not a national security threat.

CONCLUSION

This paper set out to determine if climate change posed a national security threat to New Zealand. Considerable effort was placed into understanding the impacts of climate change on both a global scale and as they relate to New Zealand, before looking at whether these constitute a national security threat. This approach has enabled the potential impacts to be placed into far better context, and avoided the temptation to over sensationalize these impacts. Using a first principles approach, this paper also discussed the concepts of 'threat' and 'national security'.

Climate change is currently a very important global topic, and will likely remain so for many years ahead, and as New Zealand has put its voice behind the international effort to mitigate the effects of climate change, it was important that the potential national security impacts of climate change on New Zealand be explored.

In the short to medium term, New Zealand will likely benefit from climate change through increased growing seasons, potentially increased exports, and a warmer more healthy climate in which to live. However, it is apparent that climate change has the potential to cause issues for New Zealand across many government departments. It is also quite possible that the combined impacts of climate change will overwhelm the coping mechanisms of some nations within New Zealand's area of strategic interest, resulting in a decision by the New Zealand Government to intervene militarily in these nations to assist in maintaining stability. However, these decisions will be made as part of governmental policy in the same way that current decisions to intervene militarily in other nations are made. Such decisions are generally made because it is in New Zealand's economic interest to promote stability or to be seen as a good international citizen, and not because the matter is a national security threat to New Zealand.

Therefore, just because New Zealand may become militarily involved in a climate change related matter, does not indicate that the matter was threatening New Zealand's national security.

This paper has argued that the link between climate change and security threats is currently tenuous. Social and political factors behind any particular issue will determine whether that issue becomes a future security threat. Climate induced change is likely to increase tension and social suffering in many vulnerable parts of the world, but this does not mean that this increased tension will develop into a security problem. Climate change impacts are highly likely to be gradual, and so if the political will exists they can be dealt with in a timely manner using appropriate policy. Such responses to climate change impacts may include humanitarian assistance, development and reconstruction assistance, or, in certain cases, the deployment of the military to provide stabilization to an affected area until the local government can re-establish itself.

Looking 100-200 years into the future, if the higher temperature increase predictions eventuate, then it is more likely that New Zealand, along with the rest of the world, may suffer because of climate change. For as noted by New Zealand's Ministry of the Environment, "Climate Change will not happen over night, but the inertia of the climate system also means that we cannot stop the climate from changing once we decide we've had enough change." [191] However, when looking into the long-term future, one of the great unknown factors is how much technological innovation will occur over that same time period to enable nations to successfully adapt to these longer-term impacts of climate change.

Finally, the impacts of climate change will likely present significant challenges to New Zealand over the decades ahead, but these will mainly be from a foreign policy and economic

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[191] Ministry for the Environment (NZ), *Climate Change Impacts on New Zealand*, 2001…

perspective. These challenges are highly unlikely to threaten New Zealand's national security. The current research indicates that New Zealand is unlikely to be badly affected by climate change for at least the next 100 to 200 years. This gives New Zealand, along with many nations of the world, sufficient time to adapt. However, in order to mitigate the overall effects of climate change, then the sooner that global action is taken to stabilize GHG emissions, then the less that adaptation will be required.

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